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THE "SPANISH DIGGINGS," WYOMING

SCIENTIFIC expeditions from the Field Museum of Chicago; the American Museum of Natural History, New York; the University of Nebraska; Yale University and Amherst College have within the past few years studied the vast aboriginal quarry section in Eastern Wyoming locally knows as the "Spanish Diggings," because of the belief of ranchmen in the vicinity that none of their Indian neighbors could have accomplished work so vast and the further belief that some of the earlier Spanish explorers had visited the region in search of gold and silver.

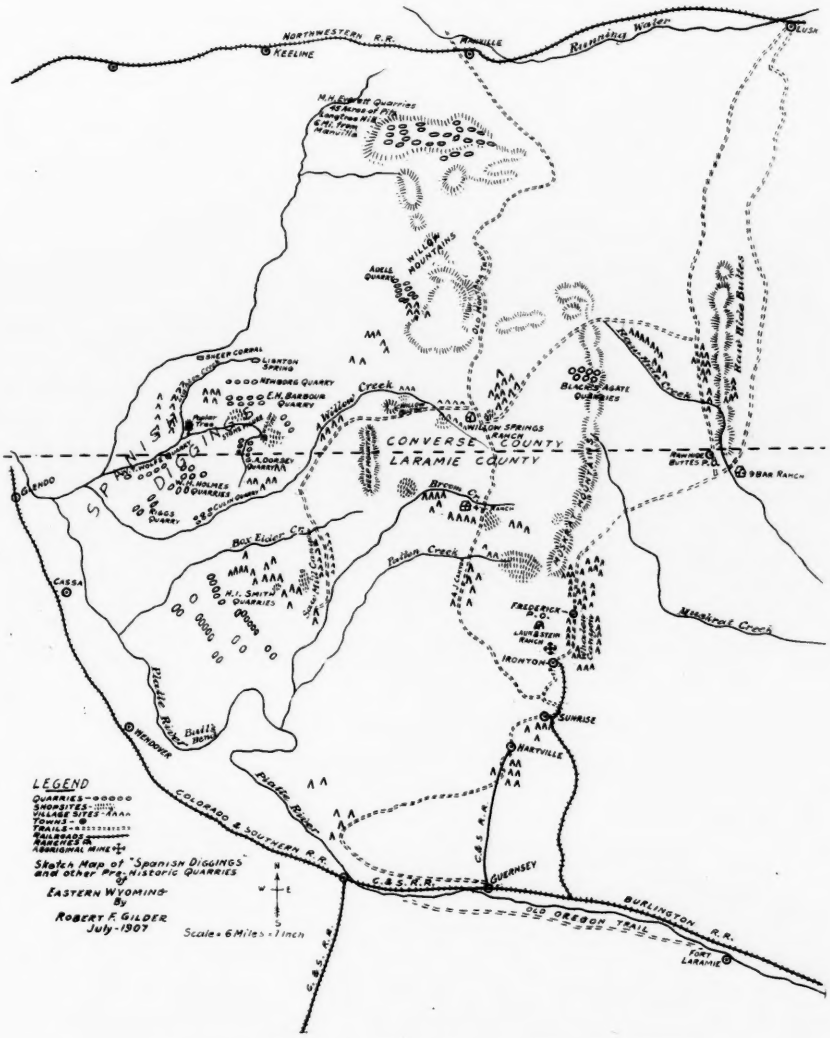
There are few states so little known to the outside world to-day as Wyoming. In Europe and the eastern states it is perhaps best known by reason of the fame of Yellowstone Park and as containing immense fossil beds. Mr. Harlan I. Smith, of the American Museum of Natural History, designated the foothills and plains of Wyoming as "darkest archæological America." Mr. Smith has recently returned from his second reconnoissance into Wyoming and has in preparation a detailed report of some of the more remarkable series of picture writings and carvings, aboriginal quarries of ancient age and uncertain origin, as well as Indian forts and cairns, which he examined.

All of the expeditions which have been conducted under personal supervision of eminent anthropologists and geologists have sent to their museums thousands of the quarry blocks and finished stone implements found in the neighborhood of the works. The writer of

QUARRY IN "SPANISH DIGGINGS" SHOWING REFUSE ROCK AND MANNER IN WHICH IT WAS THROWN OUT OF THE PITS

this article has also made large collections and still there are hundreds of thousands of similar implements scattered over the territory for miles in every direction.

The region in which the largest collection of quarries exists is even to-day one of extreme wildness, completely given over to wild range cattle and predatory animals, where the "whir-r-r" of the rattlesnake greets one's ears daily and where few people go for pleasure. There is conclusive evidence that there was a vast population here at the time these quarries were worked. There is no section of the entire world which can show any quarries of such magnitude as the "Spanish Diggings." The great central plains rise steadily from an altitude of about 1,000 ft. at the Missouri river to 5,000 ft. The country has a level prairie aspect with breaks and canyons in the proximity of water courses, with certain regions covered with lofty sand hills and others diversified by sightly buttes and mesas. This great inclined plain is composed essentially of tertiary strata, chiefly the famous bad lands clays and more recent Loup Fork sands. As one travels westward, the mountains seem to rise suddenly and abruptly out of the level plain. Before reaching the mountains proper, folds and uplifts such as the Black Hills and Rawhide Buttes are encountered—they being but eastern extensions of the Rocky Moun-



MAP OF THE "SPANISH DIGGINGS," WYOMING

tains themselves. West of the steep and rugged Rawhide Buttes the aboriginal quarries begin, covering a territory approximately 15 by 40 miles. Here every hillside, where the material would warrant, shows prehistoric quarries; every level spot, crowded stone tipi circles; and every summit, shop sites. Such an array of beautifully-colored quartzites, jaspers, agates and moss agates probably is unknown elsewhere. There is exquisite barbaric splendor in some of the rock colorings, there being every tone, tint and shade to suit a savage

taste; white, gray, lavender, violet, purple, pink, red, vermillion, red and white mottled, striped and banded; light yellow, brilliant yellow, dark yellow, light and dark browns and black. There are no such beautiful quartzites in any other part of this country. In texture they are fine and dense, breaking with deep conchodial fracture. In addition the quarrymen worked flint, agates and chalcedony of many colors.

How many quarries there are, no one would hazard a guess as they are everywhere for miles. Tons of chips, cores, rejected implements, broken implements and occasionally finished pieces are found around the slopes, upon the eminences and in the canyons. Attempts to approximate the work done, the time it required and the number of persons engaged fail utterly.

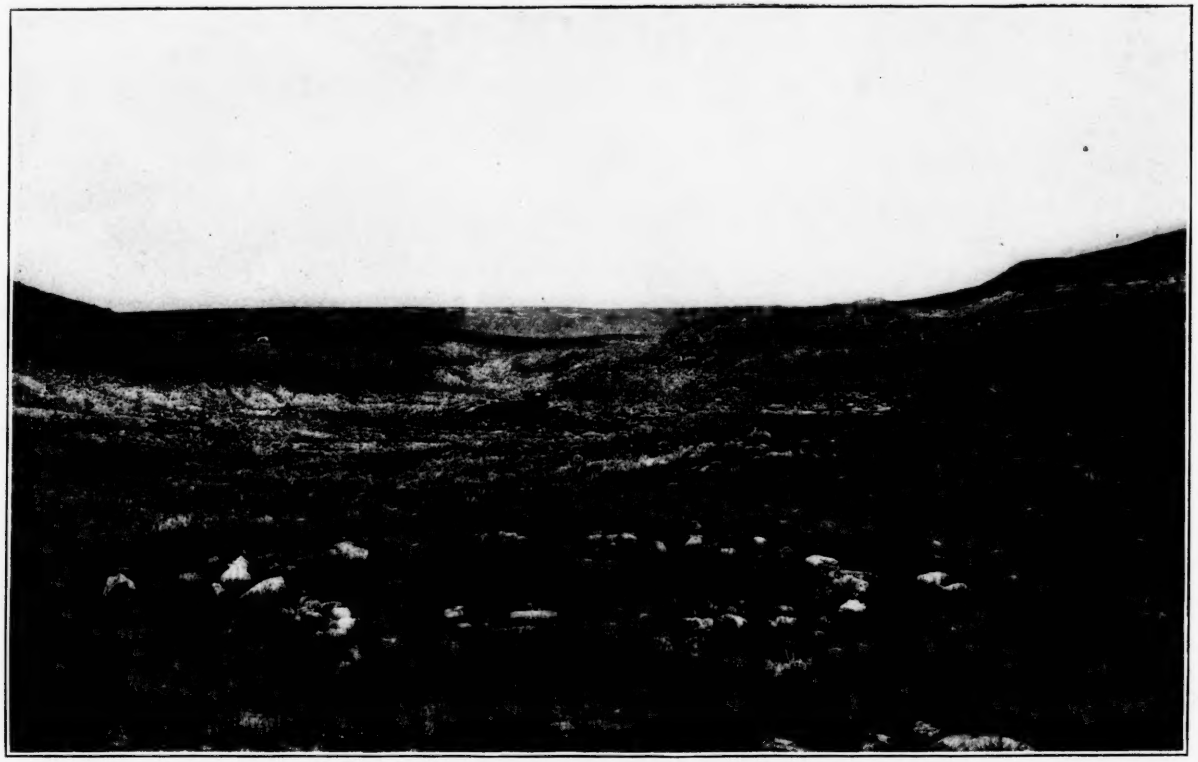
Among the largest quarries are a score located on a remnant 8 miles long that presents an escarpment to the west composed of shale capped with 80 to 100 ft. of sandstones that in many places have passed from sandstone to quartzite of varying qualities and colors. The work surely must have taxed the energy of countless tribes for generations. An adequate conception of the magnificent extent of this work cannot be conveyed by description. It must be surveyed with one's own eyes.

The blocks taken from the quarries were carried to convenient points, where the artisan seated himself on the ground or a rock, as is evidenced by the innumerable piles of chips.

Either the stone implements fashioned at the time were large and crude or they were only roughed out here and were carried away to be dressed into final shape elsewhere. Thousands of great hoe-like implements are to be found on the surface, usually shapely in outline, but crudely chipped and in many cases their size and weight shows them unfinished and precludes the probability of their use as hoes. Whatever they are, their number is so great that several hundred may be gathered from a few acres.

Wedges used in quarrying—ordinarily objects of rarity and interest—are made of granite, an occasional wedge being found in place just where the quarryman left it, possibly thousands of years ago, with head badly battered and broken. They are generally 6 to 8 in. long and triangular in section. Around the quarry pits are grooved mauls of granite, quartz and diorite, all more or less broken by much use.

By far the largest number of implements found are scrapers of jasper, flint and quartzite, varying in size and well made. Next in point of numbers are large leaf-shaped implements 5 or 6 in. wide that might have been intended for agricultural use. One remarks the scarcity of projectile points, but whenever they are found, they are seen to be very well formed.



VILLAGE SITE SHOWING TIPI RINGS, "SPANISH DIGGINGS," WYOMING

GEORGE A. DORSEY QUARRY, "SPANISH DIGGINGS," BANDED RED AND WHITE QUARTZITE. DOCTOR DORSEY, IN 1900, SECURED FIVE BARRELS OF TYPICAL BLOCKS FOR THE FIELD MUSEUM, CHICAGO

QUARRY BLOCKS, "SPANISH DIGGINGS." GROOVED MAUL IN CENTER IS WHERE IT WAS DROPPED BY THE PRIMITIVE ARTISAN

Tons of cores have been left by the primitive artisan just where he spalled off chips in forming implements. Shallow mortars or metates are frequently met with about the village sites varying in size up to a foot square. A number of double-bladed quartzite axes show skillful workmanship.

About the quarries are thousands of tipi rings from 15 to 20 ft. in diameter made of small boulders and intended to hold down the edges of skin tents all of which opened to the south to admit the warm sunshine, as indicated by gaps in the rings. These rings, placed so close together that there is only room to pass between, are apparently without order in their arrangement.

An explorer's first and most natural question is: Who were the people who performed this titantic task? The tipi rings and extensive quarries evidence a population so dense that the surrounding country for hundreds of miles would not support it and the inference is that habitation was periodic. Agricultural implements in such numbers seem to be out of place in a region whose precipitation is so scant and whose altitude so high, that corn cannot be grown. The nearest point where implements could be used in the cultivation of this

staple is eastern Nebraska, distant at least 500 miles. In the adjacent mountains the primitive tribesmen could, without labor, find unlimited supplies of raw material for the manufacture of stone implements. The people who inhabited the Mississippi and tributary valleys for hundreds or perhaps thousands of years, called for want of a more accurate name, Mound-builders, practiced agriculture and required a large amount of material for stone hoes and spades. The North Platte river, which is close to and parallel with the quarries for a distance of 40 miles, is navigable for small boats or rafts in the spring when the mountain snows are melting. The product of the quarries, consisting mainly of implements in the rough, could easily have been floated down the Platte some 700 miles to the Missouri and then be distributed to all parts of the broad area reached by water.

Many of the larger collections of stone implements found in eastern museums gathered from old village sites east of the Mississippi river contain implements which have been identified as having been made from material brought from the Wyoming quarries.

Who the quarrymen were, may never be known, but the vast work performed has no counterpart on this continent. Investigation of some of the quarry pits shows a depth of more than 30 ft. Strange stone figures of immense proportions representing human beings and thousands of stone cairns are strewn over the landscape for miles. The isolation of this vast field for scientific research, the scarcity of water in the neighborhood and the absence of wood have been the chief causes for its lateness in exploration. It is impossible to go into the country at all without a guide and, as no one lives there, a guide who knows the whole territory is difficult to secure. The best route is by way of the Willow Springs ranch, whose owner, Mr. Thompson Black, has materially assisted many scientific expeditions by locating springs, water holes and the last point at which wood for camp fires can be obtained.

ROBERT F. GILDER.

Omaha, Nebr.

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LEGAL AND COMMERCIAL TRANSACTIONS CHIEFLY FROM NIPPUR

TO THE constantly increasing number of volumes, issued by the Department of Archæology of the University of Pennsylvania, Prof. A. T. Clay has added another splendid volume*, which fully sustains the high standard of the preceding ones. Of the 10 volumes of the "Babylonian Expedition of the University of Pennsylvania, Series A," which have thus far made their appearance, Professor Clay has contributed about one-half, namely vols. VIII, X, XIV, XV in full, and vol. IX in part. He has, therefore, had a large share in making the important results of the 4 Babylonian expeditions of his University known to the scientific world.

The latest volume, issued by Professor Clay, contains legal and commercial documents from the Assyrian, Neo-Babylonian and Persian periods. There are 6 kings of the Assyrian period represented by the tablets, beginning with Ashur-bân-apal and ending with Sin-shar-ishkun. Of the Neo-Babylonian kings we find 5, beginning with Nabopolassar and ending with Nabonidus. Of the Persian kings we find 7, beginning with Cyrus and ending with Darius II. The list is closed with Philip of Macedonia. Hence there are not less than 19 kings represented by the 159 texts of the volume.

The tablets, published by Professor Clay in this volume, are taken from 7 different collections. Most of them (115 tablets) were found by the second and third Babylonian expeditions of the University at Nippur. The second series (19 tablets) comes from the E. A. Hoffman collection, preserved in the General Theological Seminary in New York City. Most of these tablets are dated in Borsippa and one (No. 2) in Babylon. A third lot of 10 tablets was taken from the first Khabaza collection (designated Kh), bought for the University Museum in London by the late E. W. Clark on August 15, 1888. Several of these tablets are dated in Babylon, one at least at Kish (No. 113.) But this does not prove conclusively that they were dug up at these places. They may have been stored at some other city.

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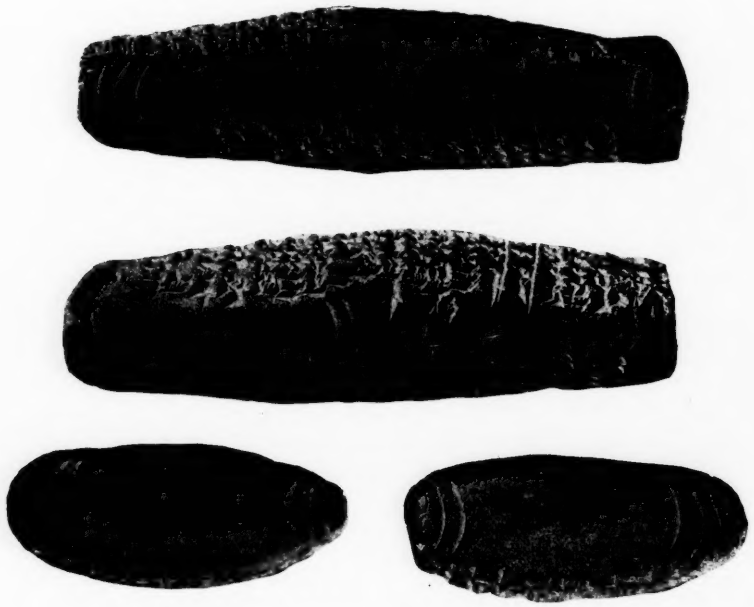
*_Legal and Commercial Transactions dated in the Assyrian, Babylonian and Persian Periods chiefly from Nippur._ By Albert T. Clay, Ph.D., Assistant Professor of Semitic Philology and Archæology, University of Pennsylvania. Volume VIII, Part 1, of _The Babylonian Expedition of the University of Pennsylvania, Series A, Cuneiform Texts,_ edited by H. V. Hilprecht, and published by the Department of Archæology, University of Pennsylvania, 1908; pp. 85, pls. 72+IX. $6.00.



CONVENTIONALIZED THUMBNAIL MARKS

One of the texts mentioned by Professor Clay (Vol. X, No. 1) was dated in Babylon, but was found in the Murashû archives at Nippur. The second Khabaza collection (designated Kh^2) is represented by two tablets (Nos. 14, 116), dated at Sippar. The Joseph Shemtob collection (marked J. S.) has contributed 8 tablets, dated at Babylon and Borsippa. Three tablets belong to the J. D. Prince collection (marked J. D. P.), two of which are dated at Babylon. Finally one tablet (No. 141), comes from the Metropolitan Museum of Art, New York City. It is remarkable because it is the only tablet found thus far of the reign of Sin-shum-lishir, one of the last Assyrian kings.

In the introduction to the book Professor Clay discusses some of the interesting questions, raised in connection with the new texts. He calls attention to the oath-formula, which was in use in Nippur in connection with business documents. On tablet No. 58 the oath formula reads as follows: "That they would not alter the tablet to the end of days, they swore by Ellil and NIN-LIL, the gods of their city; they swore by NINIB and Nusku, the guardians of their peace; they swore by Cyrus, king of countries, king of kings, their Lord." This oath-formula, which occurs in Nippur in a similar form as early as the Cassite period (Clay, B. E., Vol. XV, p. 2), unites the chief gods of Nippur together with the reigning king. But the oath-formula does not seem to have been applied in all cases. It is found only on a few of the many tablets given in the book.

ARAMAIC ENDORSEMENTS

Another interesting feature of the tablets published by Professor Clay are the thumbnail marks found on them. They are substitutes for the seal impressions, made by the person upon whom the obligation rested, or by the one who signed a receipt. Professor Clay calls attention to the fact that, because of their peculiar shape and perfect regularity, they could not have been made by a thumbnail, but must be due to an instrument, perhaps the stylus of the scribe. There are usually 9 marks on each of the two edges and 6 on each of the two ends.

There are also a number of very interesting seal impressions on the tablets. As the scenes represented on them are usually religious, giving the various emblems of the Babylonian gods, they are of great importance to the student of Babylonian religion. It is certainly to be hoped that the large collection of seal cylinders, which the Museum of the University possesses, may be made accessible to students by their publication in the not too distant future. In order to put the subject upon a scientific basis it would be very desirable to know first of all the seals on all the dated documents. They would furnish a safe criterion for the undated seal cylinders.

In connection with the thumbnail marks and the seal impressions we may mention the Aramaic endorsements, found on 15 of the tablets.

They have been deciphered as far as possible by Professor Clay with his well known ability. They usually contain the name of the person or persons on whom the obligation, mentioned on the tablet, rested. They were put on the tablet with ink or were incised by a sharp instrument for the purpose of easy identification and ready reference. They testify to the growing importance of the Aramaic language in Babylonia during the Neo-Babylonian and Persian empires. They are valuable (as Professor Clay has strikingly shown in his contribution to the Memorial Volume of Dr. Wm. R. Harper), because they give us the pronunciation of a number of important cuneiform ideograms, thus far unknown, and make us also acquainted with some new Aramaic words.

The most valuable part of the introduction is Professor Clay's discussion of the historical information which the contract-tablets give about the length of the reigns of the various kings, under whom they were drawn up. By giving a full list of the first and last dates of the reigns of the Assyrian, Babylonian and Persian kings, as found on the contract tablets, Professor Clay shows that they enable us to determine their length more accurately than was hitherto possible.

Especially welcome is the new light which is thus thrown on the relations of Ashur-bân-apal and Kandalânu. It was hitherto supposed by all scholars, with the exception of Professors Sayce and Opert, that Ashur-bân-apal and Kandalânu were identical, and that the latter was the name which Ashur-bân-apal assumed when he became king of Babylonia, in a similar way as Tiglathpileser was known as Pûlu in Babylonia. Professor Clay, however, shows that this assumption of their identity is not borne out by the evidence at hand. It is much more likely that Kandalânu was a relative, perhaps brother or half-brother of Ashur-bân-apal, whom he appointed as viceroy of Babylonia. In connection with this question Professor Clay calls attention to the first tablet, published by him in the new volume. It is dated at Nippur in the twenty-sixth year of the reign of Ashur-bân-apal. Of this date he says: "If it were true that he (Ashur-bân-apal) had assumed the name Kandalânu in Babylon, and in every instance, as far as we know up to the present, the ruler was known by this name in that neighborhood, it seems unreasonable to suppose that at Nippur, not more than 50 miles distant, he should be known by his real name 6 years after the death of Shamash-shum-ukîn and his own enthronement in that city." In view of the facts presented by him, Professor Clay comes to the conclusion that "it seems reasonably certain, that the opposition raised more than a score of year ago by Professor Sayce, the only living representative of this view, as far as I can ascertain, is sustained, namely that Ashur-bân-apal and Kandalânu are not identified."

As all his other books, belonging to this series, so also this volume has been provided by Professor Clay with a complete concordance

SEAL IMPRESSIONS ON THE FOUR EDGES OF A TABLET OF THE TIME OF DARIUS I

of all the proper names of persons, gates, canals, places and deities, occurring in the inscriptions. They contain important material for the student of Babylonian name-formation, geography and religion.

The 159 texts, presented in the volume, are copied with the well known skill and accuracy of the author. They are faithful reproductions of the originals, exhibiting the exact condition of the tablets with such precision that they may be said to equal, if not to surpass, the best work that has been produced in the copying of cuneiform texts.

The following translations, taken from Professor Clay's introduction, with slight changes, illustrate the variety of business transactions, recorded by the tablets.

I. SALES. The tablets record a number of sales of houses and lands. The following is the record of the sale of a storehouse, belonging to the temple Ezida in Borsippa.

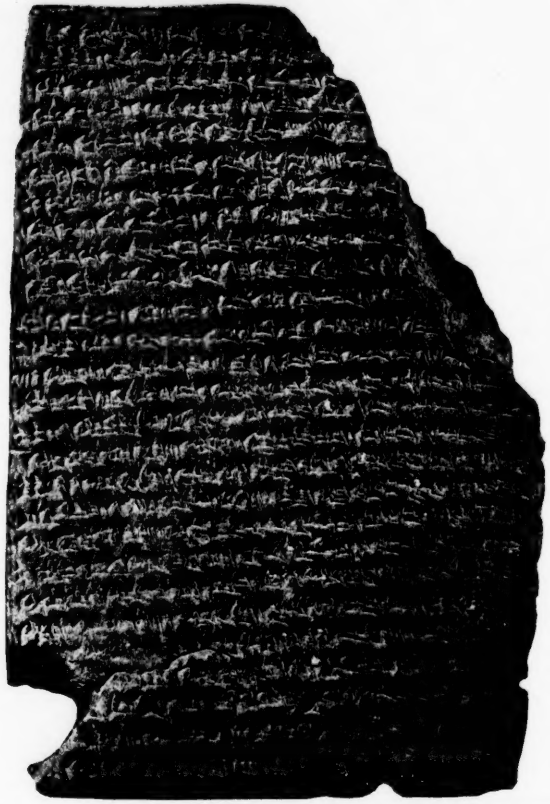
"A 12 reed storehouse, a finished house (having) a built in threshold, a covered house (with) a door (having) a firm bolt, belonging to the bright storehouse of *Ezida;* on the upper north side adjoining the storehouse of Bêl-êpush, son of Aplâ, son of Mubannî; on the lower south side adjoining the storehouse of Etillu, son of Marduk-abishu; on the upper west side along the Tarrabshu road; on the lower east side adjoining the storehouse of Nabû-iddina, son of Arkât-Damqu. Total, 12 reeds is the measurement of that storehouse.

"With Bêl-uballit, son of Amelai, the *riqqu* officer of Marduk, Marduk-kudurri-usur, son of Irâni-Marduk, the *TU* officer of the temple of Marduk, the sum of 3 minas, 10 shekels of silver for the half of the field, 15 shekels, and 2 gerahs of silver and 5 kors of dates, which were given as earnest money, fixed as its full price. Total 3 minas, 10 shekels of silver and 5 kors of dates, the full price of his storehouse Bêl-uballit, son of Aplâ, the *riqqu* officer of Marduk, received from Marduk-kudurri-usur, son of Irâni-Marduk, the *TU* officer of the temple of Marduk. It has been paid, he is freed. There shall be no reclamation. They shall not reverse it (the bargain), against each other they shall not raise a claim. Whenever in future days any one of the brothers, sons, family, people and relatives of the house of Bêl-ûballit, son of Amelai, shall arise and start a suit against that storehouse, or cause a suit to be made to annul or set up a claim, saying: 'That storehouse was not sold and the money was not paid;' the money which he received, including a (fine of) 20 per cent. he shall pay."

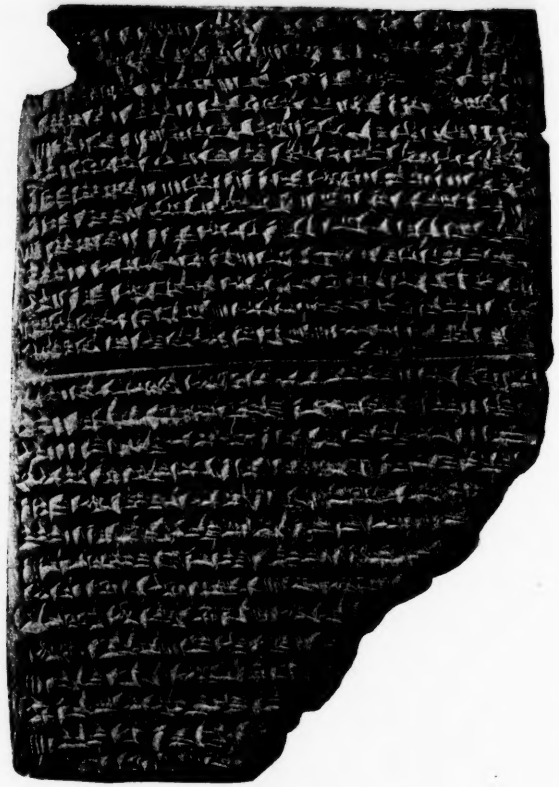
At the sealing of the tablet 9 witnesses and the scribe were present.

II. LEASES. The following is the lease of a house for two years with part payment in advance.

Obverse



Reverse



INVENTORY OF THE TEMPLE ASSETS FOR THE 40TH YEAR OF ARTAXERXES I

"The house of Sillu-Ezida, son of Nabû-shûzubanni, son of Shita, * * * and Bu'itum the *riqqu* officer, for rent is at the disposal of Nidintum, son of Bazûzu, son of the chief goatherd. For two years Nidintum shall pay 4 shekels of pure silver as house rent. Of it 2 shekels of pure silver Bu'itum has received from Nidintum. One (document) they take." (Then follow the names of 5 witnesses and of the scribe and finally the date.)

"From the first day of Nisan the house is for two years at the disposal of Nidintum. Yearly (he shall pay 2) shekels of silver."

III. EJECTMENT. An action taken to recover possession of a house.

"Nabû-zêr-ibni, the *zakzâku* officer, Shamash-mukîn-ahu, the chief royal *rab kâri,* Mushêzib-Nabû, the chief royal *rab ummannu,* Bânia, son of Ina-bîti-Ea-kittu; these are the witnesses before whom Gula-shum-lîshir, the *shandamak* officer, Marduk-shar-usur, son of Mushêzib, son of Sin-shadûnu and Anum-shar-usur, the governor of Nippur, brought Shullumu son of Tabnêa, with Bau-iqisha, son of Usâtu, before Itti-Ellil-balâtu, son of Usâtu. The house of Bau-iqisha in which thou art dwelling, return and give to Bau-iqisha. Out of it go! On the 30th day of Elul of the 2d year of Nabû-na'id, king of Babylon.

IV. RECORDS OF DEBTS. Loans of money on good security were common. The following is a record of a debt of dates, for the payment and delivery of which another becomes responsible.

"Three kors of dates, valued at two shekels of silver, due to Shamash-ah-iddina, son of Tabnêa, due from Ibni, son of Rîmût. On the 7th day of Tishri, in the *hazata* of Bêl-ab-usur, he shall pay the dates. Zêr-ukîn, son of Pir', bears the responsibility for the repayment. The dates Zêr-ukîn shall carry from Shiriqtum and give to Shamash-ah-iddina."

The names of 3 witnesses, the name of the scribe and the date follow.

In the following record a slave girl is given as security for the payment of a debt.

"Fifteen shekels of silver, in ½ shekel pieces, due to Izzianna, son of Ahu-tâbu from Nergal-iddina, son of Ahu-lûmur. Shininni-Bau, his young female slave is the security for the silver due to Izzianna. When Nergal-iddina shall pay his money he shall take his female slave. There shall be no rent for the slave and there shall be no interest on the money."

The names of two witnesses besides that of the scribe follow, also an Aramaic endorsement, reading "Nergal-iddina."

V. MEMORANDUM OF PAYMENTS. The following is a memorandum of payments made by the chief of the temple tithes at Nippur.

"Four shekels of silver in the month of Tishri, in the presence of Kurila (son) of Nabû-uballit; a fourth (of a shekel) of silver, in the

presence of Nabû-uballit; 3 shekels of silver, in the presence of Ninib-erba; 2 shekels of silver to Ardi-Gula, in the presence of Taqîshu, son of the carpenter, and of NINIB-erba; 9 kors of barley from the hand of Marânu, the chief of the tithes of Ellil, Bêl-zêr-iddina received from the hand of Murânu, a memorandum which is not forgotten. Total, 18 shekels of silver."

VI. Receipt of Taxes. The following is a receipt of taxes paid by one person for another.

"Three shekels of silver, the tax for the first year of Barzia, king of Babylon and of countries, which is from the month of Elul of the first year unto the month of Elul of the second year. The tax of Mitia son of Mushêzib, Shamash-erba, son of NINIB-ah-iddina, has received from the hand of Ardi-Gula, son of Shamash-iqîsha."

The names of two witnesses, of the scribe and the date follow.

VII. Promissory Note. The following note, bearing interest at 20 per cent., includes also an additional security.

"One mina 5 shekels of silver (due to) Nabû-mukîn-zêr, son of Iddina, son of Gahul, to be paid by Nabû-tabni-usur, son of Aplâ, son of Gahal. Monthly one mina shall bear one shekel of silver as interest. In addition the former document regarding a seedfield on the Kish-road, which he shares with his brothers (is held) as security of Nabû-mukîn-zêr against it. He shall pay in full the money, as much as is against him."

The names of 4 witnesses, of the scribe and the date follow.

VIII. Transfer of Office. The following is an agreement to turn over the income of a temple office to another for one day, after which it is permanently assigned to the man's son.

"For one day, the 27th day of Elul, the income of the office of shepherd of Ezida, the temple of Nabû, Nidintum-Nabû, son of Rîmût-Gula, son of the oxherd, his income, of his own free will, sealed and for a day entrusted to Nabû-mukîn-zêr, son of Alpâ, son of the oxherd. After the 28th day of Elul, Nidintum-Nabû entrusted it to Rîmût-Nabû, son of Nabû-mukîn-zêr forever and * * * "

The names of 3 witnesses, of the scribe and the date follow.

William J. Hinke.

Auburn, N. Y.

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AN OUTPOST OF CIVILIZATION IN

RECENTLY DISCOVERED CLIFF-DWELLINGS OF THE SIERRAS MADRES

THOSE races of men that have emerged from the darkness of the unknown to sweep across the history of the world with the effulgence of a meteor, and then to disappear as suddenly and as mysteriously as they came, leaving behind them only a train of ruins to show their former state—have always been of peculiar interest to mankind.

No part of the world contains more striking examples of this type than America, and no people possess a greater amount of human interest, or experienced a more mysterious existence and fate than the Cliff-dwellers of this continent. Their ruins alone, scattered always among the most inaccessible cliffs and canyons of the Rockies from Colorado and Utah far into the Sierras of Mexico, make a mute appeal to our sympathies for their builders. Driven to seek safety in the innermost recesses of the mountains, they lived their lives, how we can but guess, and went none know whither.

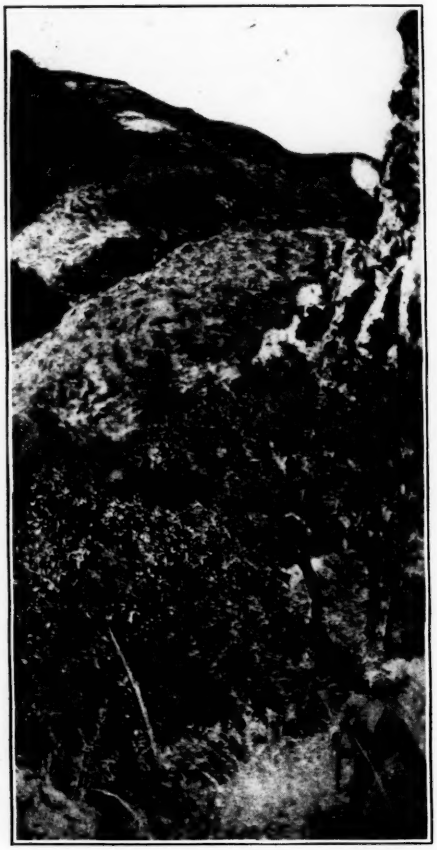
The writer has recently had the good fortune to complete the exploration of a previously unexplored group of ruins of these people in a valley hidden far in the fastness of the Sierras Madres of Mexico. In fact, so remote and inaccessible is the surrounding country that but little surprise can be experienced that the remains which were the object of this expedition were first discovered from a distant mountain peak by our guide, Mr. J. H. Hughes, but 3 months before our visit.

THE FOOTHILLS OF THE SIERRAS

and that up to that time the valley in which they are situated had not known the tread of a white man's foot.*

It was the news of this discovery that lured the writer and his companion, Mr. A. R. Coleman, across the valley of the Casas Grandes, where the remarkable ruins of that name are located; miles up the Tenaja, between high red cliffs; over the pine covered mountain ridge to the Rio San Pedro with its remains of picturesquely located villages of by-gone days, its triple series of rock walls looking down upon the narrowest pass; on past its headwaters and over the continental divide; through the tangled mass of the Sonoran Sierras, sometimes upon the almost perpendicular mountain side, again far down in the silent canyons until at last, half leading, half dragging the unwilling horses we slid down the sides of the Cerro Diablo into the depths of the long-sought canyon. However, while crossing the bald rocks on the mountain summit, one member of the party sustained serious injuries from a falling horse, and another barely escaped a similar fate by an acrobatic display of agility in rolling from under the striking hoofs of another fallen animal. Here also five of the pack burros were on their sides at one time, as even these sure-footed little animals were unable to keep their footing. Indeed so perilous were the precipitous sides of this mountain that at first glance it seemed a physical impossibility for the animals to decend at all, and this they only consented to do when

*Many of the hardships of the expedition were greatly mitigated by the courtesy and assistance of Mr. Mell Womer—a large land owner of Casas Grandes—and Mr. McTavish—the latter of whom accompanied the party—and further by the hospitality of the officials of the Dos Cabazos mine—to all of whom the writer desires to acknowledge his indebtedness.



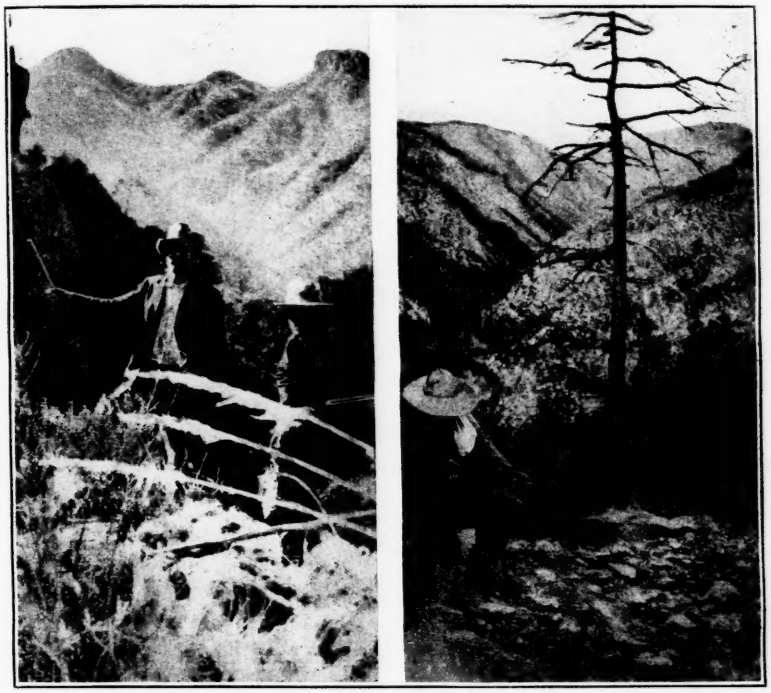
VIEW FROM CLIFF-DWELLINGS

forcibly hauled, slipping and sliding in zigzag paths down the hazardous declivities. Thus it was that the writer felt but slight compunction in attaching to it the name of the Cerro Diablo, or mountain of the Devil.

Picking our way up the canyon bed we passed the bones of a horse the guide had left here on his former trip, the animal having been killed and eaten by the mountain lions, "tigres," wolves and bears, signs of which were abundant about the remains, and camped as near the main cliff-dwellings as possible on the bank of a crystal stream, one of the headwaters of the Basserac, which in turn flows into the Bavispe. So deep is the canyon and so high the surrounding peaks at this point that the sun rose about eleven o'clock and set a few minutes after one. Indeed one of the party shot two deer far up the mountain side, both of which rolled within 20 ft. of where he was standing. The wild animals in this section are most numerous and of very formidable species, and seemed, through unfamiliarity with man, to entertain an appalling disregard of the proper etiquette pertaining to their position as the hunted. In one case a bear and a mountain lion nearly succeeded in reversing the positions, and in themselves assuming the role of hunters.

In the immediate vicinity of the camp there were no remains except a number of small trincheras, or terraces with retaining walls, and one stone wall about 2½ ft. high, that ran parallel with the stream, and that probably also came under the latter classification.

The worst portion of the journey, however, lay ahead, for from this, the nearest accessible camping place, the cliff ruins were nearly half a day's climb over masses of loose stone which afforded but precarious footing at best, along great cliffs with dizzy heights, and



IN THE CLIFF-DWELLERS' COUNTRY

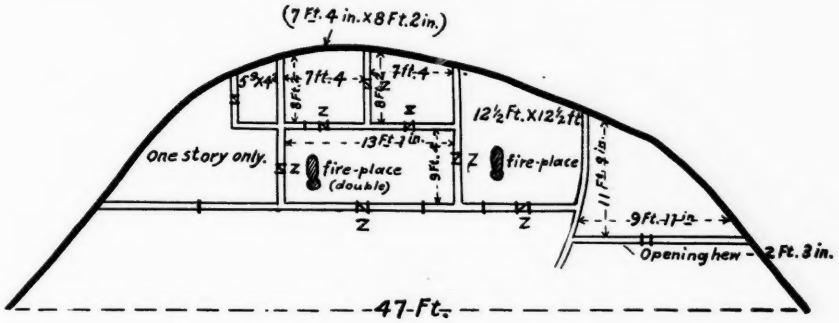
across the face of bold projecting rocks where only with body prostrate and eyes averted from the abyss below was the trip possible. Burros or horses were of course out of the question here, for as one of the old Mexican laborers sagely remarked, it was a country, "good but for bears, eagles and men." Tools for excavating were carried with the greatest difficulty; frequently they were placed ahead on a secure ledge, and then freed from their weight, the bearer grasping a tuft of grass or blade of cactus, would slowly draw himself up to them. Finally, scrambling literally upon hands and knees, the main ruins were reached.

These are situated in a large cave in a high dike of red porphyry which bisects the country in a northeasterly by southwesterly direction on the western face of a mountain, grand in its sweeping majesty, that forms a portion of the backbone of the continent as along its distant sky line runs the continental divide. This mountain the writer named, "La Madre Bonita," and estimated its altitude at about 10,000 ft. above the sea. The formation here is extremely favorable to the existence of caverns through erosive processes, and exhibits in many places a strongly marked and highly mineralized contact with the country rock.

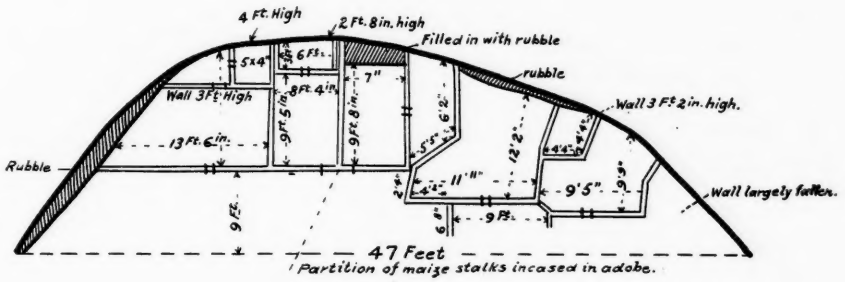
At the point where the main cliff-dwellings are located, the dike is cut asunder by the waters of Cliff Canyon, and forms two towering red portals to the upper portion of the gorge. Its precipitous sides are studded in many places with small caves which do not generally seem to have been utilized as dwellings, owing principally to their comparatively small size and to the formation of their bottoms which like the generality of creation in this country stand on end. However, two nearly inaccessible ones across the canyon while containing no apparent remains of walls were probably at one time inhabited.

In this section, as in Cave Valley in Chihuahua and many of the ruins in the United States, the proximity of the pueblo remains to those of the cliff-dwellings is striking. Here indeed, if coexistent, the same agricultural plots must have been tilled in common by the inhabitants of both, while the texture, make and design of the pottery is similar, and the wide-spread resemblance of the salient structural and architectural features of the buildings is strongly marked. There is little doubt that both these types of ruins belong to the same people, and though they built in caves when practicable, a great number were forced to erect pueblos or communal dwellings on the almost equally isolated and impregnable steps in the sheer mountain side or, as in one case hereabouts, upon the summit of an outlying spur, the valley bottoms affording hardly room enough alone for the streams that coursed through them. Owing to the lack of shelter which their situations entailed, but little is left above ground of the pueblo remains in this section. In spite of the apparent disadvantages the prehistoric population was large.

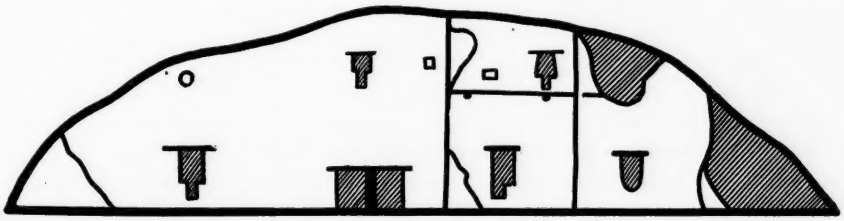
The principal cave is 47 ft. wide across the mouth, about 27 ft. deep and 11 ft. high, containing 16 or more rooms or "houses," the front ones being in a poor state of preservation and the wall lines hard to determine, though they were probably of but one story in height, the back ones being of two stories and well preserved. These buildings reach from the bottom to the top of the cave. The material of which they are constructed is an exceedingly hard adobe of dark-reddish color, probably made from the dust formed by the disintegrated portions of the cliff itself. The walls as a rule vary from 10 to 12 inches in thickness and contain the grain-shaped doors and circular openings common to this class of buildings. The doors were thus constructed—large in the upper halves and small in the lower—to admit a person with a maximum load but a minimum amount of cold air. This form also had strong defensive advantages. Two coats of plaster are clearly discernable, both greatly soiled and covered with smoke, while on the outer walls of the lower rooms, a faint design in black and red is barely visible. Its lines however seem to follow slightly those of the rain-cloud symbol, and are of a totally different type from the comparatively recent Apache decorations on the walls of the cliff-dwellings



UPPER STORY



LOWER STORY



VERTICAL PROJECTION

PLAN OF CLIFF-DWELLINGS IN MAIN CAVE

II, Doors. I, Circular Openings. Z, Sealed Doors. X, Partially Sealed Doors. Shaded portions of the vertical projection, are openings, and the curved lines generally represent crumbling adobe walls.

to the East in the Sierras of Chihuahua. This was the only pictograph noticed, not only in this cave but in the entire region, the literary or artistic talent, whichever it might have been, of the ancient inhabitants having evidently been exhausted with this one masterpiece.

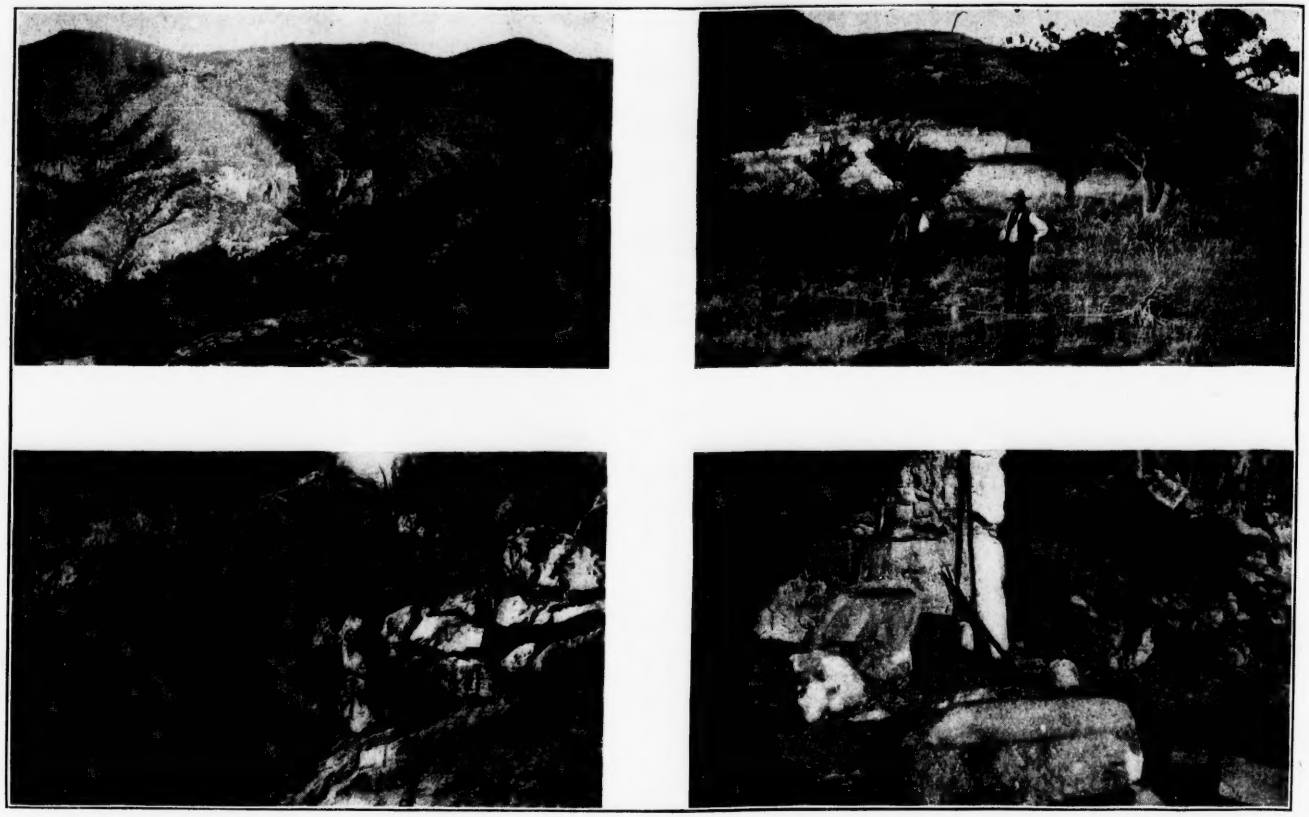
The following illustrations clearly show the plan and dimensions of the rooms or "houses," and at the same time strongly impress upon one the fact that the dwellers therein were not of great size. Sturdy, however, they must have been to have carried the water requisite for making the heavy adobe over breakneck paths from the canyon bottom, and to build the many stone walls on the precipitous mountain side.

Heavy pine and juniper beams hacked into shape with rough stone axes were used as the base of the floor of the second story, over these maize stalks were thickly laid and in some cases small boughs; this was in turn covered with adobe and made a strong and solid support. In the center of two of the upper rooms raised ovals of dried mud, constituted rude fireplaces. One of these was double, consisting of two hollow rings, one large and one small.

The marks of what threatened at one time far back in the centuries to become a serious tragedy were here clearly evident, for the adobe had worn thin in places and the maize stalks and wooden beams beneath had become ignited. Fortunately the flames were discovered and extinguished before they had made much headway, and the damage was then carefully repaired.

Small sticks arranged in single rows still remain firmly embedded in the walls of the back rooms of the second story, and doubtless in days gone by, supported articles belonging to the domestic department of the cliff people. In one of these rooms was also found a peculiarly shaped stone implement about 5 in. long and slightly curved with a short rubbing surface at the bottom of the curve. This was probably used in the curing of skins.

Small circular openings on the sides of the doors admitted light and air in limited quantities when the door itself was closed, and probably at times also served as loopholes. The back rooms on the lower floor were of a very restricted nature, owing to the cave formation, and could have been used for nothing but store rooms or pens as the cliff-men doubtless often kept wild turkeys in captivity. In one of the front rooms a corner had been walled off by means of a low partition about 3 ft. high. Just what was stored here, it is impossible to state though maize was probably the product. The accompanying illustration not only shows this enclosure but also the size of the upright posts and horizontal beams and the manner in which they were joined with a casing of adobe. In the same room was unearthed an olla or water jar of the lower undecorated type, but no human



CLIFF-RUINS

La Madre Bonita Showing Canyon in Which Are Located the Main Cliff-ruins

Small Level Spot on Top of Cliff Used by Cliff-dwellers for Agricultural Purposes. Marked by Series of Trincheras

Portion of Retaining Wall of Plaza

Mouth of Cave Showing Portions of Walls, Stone Metates, Maize Stalks, and Ancient Ladder Pole

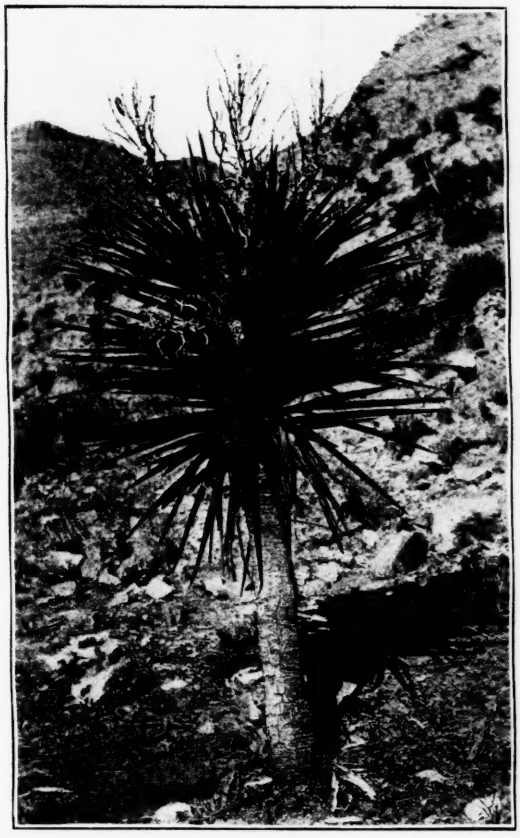
PORTION OF FRONT OF CLIFF-DWELLING SHOWING TWO STORIES, LADDER POLE, GRAIN-SHAPED DOOR AND SMALL OPENING OR WINDOW TO THE LEFT OF UPPER DOOR

remains were encountered. A small shelf about 12 in. long by 6 wide, neatly moulded in the adobe wall was also noted in this section of the ruins.

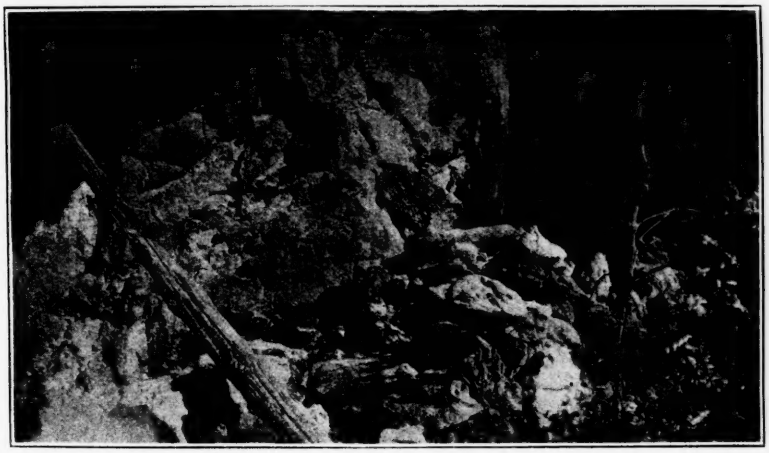
The back of most of the lower rooms was squared off with a wall of stone, beyond which was nothing but rubble, although in the dust behind a wall of this nature, which stood along the side and towards the front of the cave, was found a toy dish of grey ware, a spindle whorl of gourd and a number of similar objects, besides some intrusive bones of small animals. In another corner under the floor, a sandal of yucca fibre was unearthed, of a size that probably belonged to a small child, some remains of pretty basketry with a fringe along its upper end was also discovered here. In the same place were a number of stone objects.

In front of the cave extends a plaza 124 ft. long and averaging 20 ft. in width. It is faced and held in position on the mountain side largely by means of a stone wall, portions of which still stand, and on the summit of which was reared a parapet now almost totally destroyed by the wash from above. The trail from the stream in the bottom of the canyon ran along a portion of the retaining wall and entered the plaza at one end in a narrow cleft between two masses of rock. Most of this open space is covered with brush and several fairly large trees are growing upon it; to the back is the cave and the red porphyry dike, while in front spreads a view of massive peaks, great walls and pinacles of rock, and deep canyons with the silver threads of water in their depths. Almost immediately opposite, a great mountain unnamed from the Beginning, but now christened, "Las Tres Muchachitas," rears its 3 crests far into the sky.

Upon this dizzy shelf the departed cliff-dwellers probably congregated while mending their weapons, making their pottery, weaving



YUCCA PALM FROM WHICH CLIFF-MAN MADE SANDALS AND WHICH HE USED IN MANY OTHER WAYS



VIEW ALONG FRONT OF CLIFF-RUIN SHOWING REMAINS OF ADOBE WALLS AND LADDER POLES

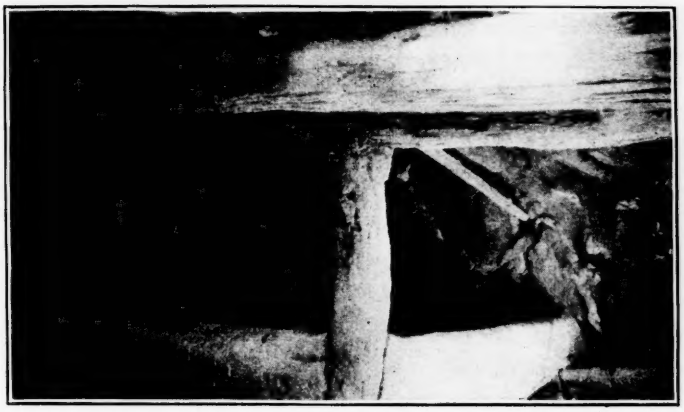
GLIMPSE OF CLIFF-RUINS FROM PLAZA

their baskets and engaging in the few other domestic arts practiced among a barbarous people. It is a plaza which has a charm and individuality peculiarly its own so thoroughly does it seem associated with the past life and activity of this section.

Throughout the region there were no signs of violence, probably due to the very inaccessibility of the country itself, as a peaceful visit alone among this wilderness of jumbled peaks and precipitous mountains would satisfy the ambition of the most warlike. There were no signs of the abandonment of a large store of maize, nor were the ruins swept clear of all the implements; no charred beams were found nor skeletons lying upon the floors under a mass of crumbling adobe as is the case in many of the ruins of the more accessible country to the east.

Here was no tragedy but rather a peaceful migration to some other country; indeed it may be that in this section dwelt those very tribes against whom the inhabitants of the eastern country attempted to guard with their outposts and fortified passes, all facing the west, but who eventually swept aside all barriers and left a trail of ruin and desolation apparent even at the present day.

How long these remains have basked drowsily through the ages in the warm Sonoran sunlight it is hard to tell; an air of great quiet and grand isolation hung over this unknown valley. Everything was just as the hands of the long dead cliff-men had left it. Many of the doors were sealed and had to be forced open before an entrance could be effected; great stone metates lay scattered around where last the maize had been ground in them, with the stone crushers or "manos" nearby; in one case a metate had been turned on end to act as a step between a lower and an upper room; the ashes of the long extinguished fires still lay in the fireplaces, the glowing embers of which were probably the last signs of life in these deserted habitations.



LOWER ROOM OF CLIFF-DWELLING SHOWING HORIZONTAL BEAMS SUPPORTING UPPER STORY, UPRIGHT POST WITH CASING OF ADOBE AT JOINT AND SMALL PEN IN CORNER OF THE ROOM

Here and there was found a stone implement or a weapon considered not worth the saving or overlooked at the last moment; pieces of matting lay in a corner as they were left, while ladder poles, 13 ft. long and notched about 4 in. from the end, probably as a means of securing them with a thong, lay near the places where they had been last set. Even portions of the yucca or a similar plant which had been well chewed and which was probably the ancient substitute for our modern gum, were found on the floor with the teeth marks centuries old still in them. One almost expected to see footprints in the dust or to disturb a slumbering cliff-man far back in one of the small dark rooms. The walls and ceilings were black with smoke and time. Innumerable flies sleeping their lives away in the darkness were aroused to life by the candles, and so long had they and their forebears lived here that the beams were encrusted with their marks.

The dust that had known no moisture for hundreds of years arose in suffocating clouds under the stroke of the pick and shovel, and several of the men, hardly recognizable, were driven staggering out into the open air. However, by means of handkerchiefs tied over the mouth and nose, the work went steadily on, but though a number of culture symbols were unearthed no human remains were found in any of the buildings—another sign of their peaceful occupation, for the writer has long believed that interments in the houses were practiced in this section only when necessity, such as siege or the immediate presence of an enemy, rendered it imperative.

Thus have these people vanished as they came—in mystery, leaving as the sole result of their existence, of their teeming numbers,

great activity and ambitions, but crumbling ruins in the deserted mountain sides, numbers of trincheras, retaining walls and here and there a bright piece of broken pottery that peeps through the grass by some ancient mound.

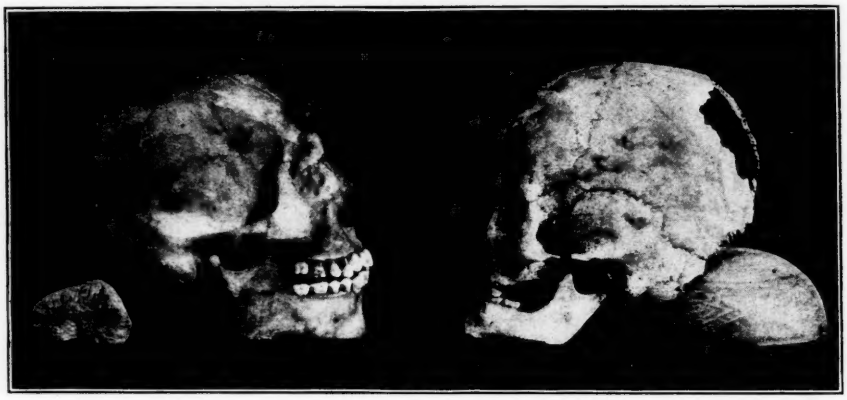
The Tarahuamaries to the south live in caves during a portion of the year and their skulls in type resemble some that have been found in the cliff ruins, but at present it seems impossible to connect them definitely by other means stronger than fancy with the races that have gone before.

The secret of the Past lies deep within the bosom of the centuries. Through all these long years it has been jealously guarded, held for him, who some day delving among the time-worn ruins, shall discover the open sesame—the link that binds the unknown to the known—perchance a colored potsherd with symbols of long dead races, perhaps but a series of cumulative facts. Already a portion of the chain has been forged beneath the great frowning peaks of the Sierras with the silent dwellings themselves as witnesses, and already the cultural influence of the contact between these races and the highly civilized builders of the great ruins to the east in the Casas Grandes and adjacent valleys seems strongly marked.

That this contact was peaceful we might well hope, but all indications—and they are many—point to the conclusion that the link for which we are still searching will lead through long years of bloodshed and destruction when the primitive passions were fanned into a flame that eventually culminated in the annihilation of not the ruder mountain tribes, but of an apparently waning yet certainly most wonderful civilization far back in the misty ages of the Past.

A. Hooton Blackiston.

El Paso, Texas.



SKELETAL REMAINS OF CLIFF-DWELLER AND CASAS GRANDIAN TYPES
Blackiston Collection in National Museum

PENCK ON THE ANTIQUITY OF MAN

THE sixth annual course of Silliman lectures was given in Peabody Museum of Yale University, from October 13 to November 2. Dr. Albrecht Penck, Professor of Geography at the University of Berlin, being the lecturer. His subject was: "Problems of Glacial Geology." Among the topics treated were: Forms of glaciation and their geographic distribution; snow-line and timber-line; glacial rivers and lakes; various forms of moraines and origin of morainic material; climate of the Ice Age; glacial systems; interglacial times; glacial earth sculpture; chronology of the Great Ice Age, and the antiquity of man.

According to Penck the Great Ice Age consisted of 4 glacial epochs (and the alternating interglacial epochs). These have been named after 4 streams of southern Germany in the foot-hills of the Alps: Günz, Mindel, Riss and Würm glacial epochs, respectively, beginning with the oldest. Penck has also been able to determine 3 well-defined stages in the final retreat of the Würm glaciation. They correspond to temporary advances during the general period of retreat. Such stages have left their traces so distinctly in the region about Innsbruck that local names have been applied to them: Bühl, from Kirchbühl at an elevation of 500 meters; Gschnitz at 1,200 meters and Daun at 1,600 meters, the latter, of course, being the most recent.

The barbaric races with whom the Romans had to contend had a knowledge of iron. It is estimated that the Bronze Age had its beginning some 3,500 years ago. The Alps were then either inhabited or visited throughout their extent by man. We find, for example, bronze weapons in the Flüela pass of the Upper Engadine. The Flüela pass was invaded by ice of the Daun stage. The latter, therefore, antedates the Bronze Age. Prehistoric copper mines have been discovered at two localities in the Austrian Alps. One of these lies at the south foot of the Ubergossene Alp near Salzburg at a height of 1,500 meters. Neolithic implements were found in the old shafts. Now this locality (Mitterberg) is near the timber-line and a slight depression of this would render it difficult to establish smelters there. The other copper mine is southeast of Kitzbühel in the Tyrol at a height of 1,900 meters. This mine also must have been occupied later than the Daun stage, at which time the region lay very near the snow-line and was uninhabitable.

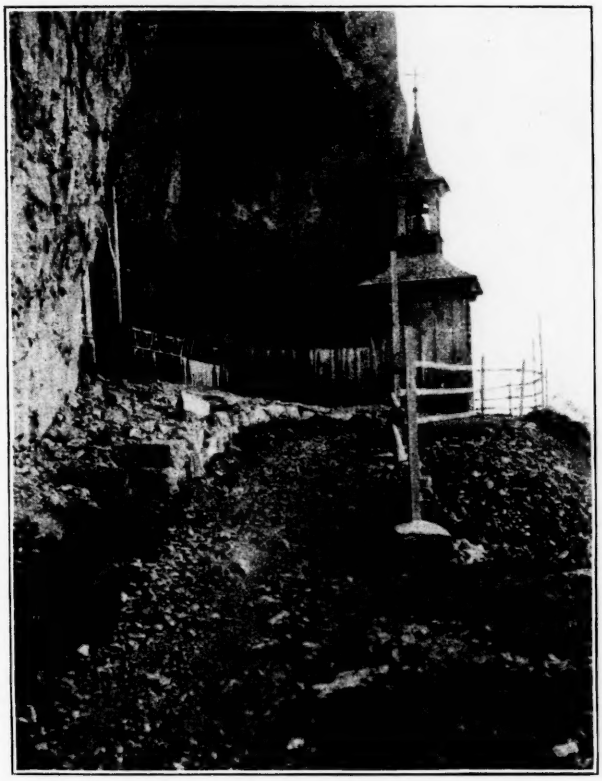
Even the whole neolithic period in Switzerland is younger than the Daun stage whose snow-line lay 300 meters lower than to-day. The minimum time therefore that separates us from the Daun stage must be at least 7,000 years.

A very long interval of time separates us from the closing epoch (Magdalenian) of the palæolithic period. For we find on the borders of Lakes Constance and Geneva animal remains of the Magdalenian epoch in terraces that are 20 to 30 meters above the present level of these lakes. Magdalenian industry is found in Switzerland well within the area covered by the Würm glaciation. But such stations have not yet been found within that covered by the Bühl stage. It may be taken for granted, therefore, that the Magdalenian industry is older than, or at least contemporaneous with, the Bühl stage which corresponds, by the way, to the Champlain stage in North America.

The rock shelter of Schweizersbild was occupied by palæolithic man after the Würm glaciation had retreated across the Rhine from Canton Schaffhausen. Here 25,000 stone implements have been found; also many bone implements and some engravings, one being of the mammoth. The palæolithic layers were covered in turn by successive deposits belonging to the neolithic, bronze and Roman periods. Taking the thickness of the deposit left since Roman times as representing 2,000 years, the time required for the whole series of deposits is estimated at 24,000 years. The total time elapsed since the maximum advance of the Würm glaciation is still longer, 30,000 years being none too high an estimate for it.

Excavations by order of the Prince of Monaco in the caverns of Grimaldi, near Mentone, furnish proof that man existed in the Riss-Würm interglacial epoch. In the cave of the Prince there are superimposed layers with interglacial fauna at the bottom and glacial fauna at the top. Mousterian implements were found associated with the interglacial fauna. This was a surprise to French archæologists who had hitherto supposed the Mousterian to correspond to a glacial epoch.

A recent discovery, in Switzerland (at Wildkirchli) confirms Penck's conclusions based on the cave of the Prince. The Mousterian station of Wildkirchli is on the Ebenalp (above Appenzell) at a height of 1,477 to 1,500 meters. It consists of two caverns with southeastern exposure that enter the precipitous face of the rock. The upper one of these penetrates backward and upward to the top of the mountain with access to the Weissbach valley below. The caverns are reached by a footpath from Weissbach, the most frequented one being by way of the gap that separates the Bommenalp from the Ebenalp. This gap was produced by faulting, which left the Ebenalp standing 300 meters above its neighbor. The last part of the way is steep and protected by a railing. It would, indeed, be absolutely broken at one point but for a wooden bridge anchored to the face of the rock.



ENTRANCE TO THE LOWER CAVERN AT WILDKIRCHLI, CANTON APPENZELL, SWITZERLAND

The caverns have been almost continuously occupied by hermits since 1621; the little pilgrimage chapel of Wildkirchli that gives its name to the place having been founded in that year. At the same time the bridge was built giving access to the caverns from the front. The hermit house stood at the mouth of the upper cavern until 1851.

As early as 1861 Rütimeyer announced the presence of bones of *Ursus spelaeus* and *Capra* in the floor deposits of Wildkirchli. Before that date the hermits used to pick up bones of the cave bear and sell them to the pilgrims. Bächler began his researches which led to the discovery of a pure Mousterian industry during the winter of 1903-04 and continued them during the two following winters. The winter is the best time to work as the caverns are then dry, relatively warm and free from visitors.

The deposits are about 5 meters thick and cover an area of several hundred square meters, so that the amount still to be excavated is much greater than that already done. About 99 per cent. of the bones found are of the cave bear, the number of individuals represented by

the finds to date being approximately 200. These remains have been found practically at all levels save in the layer at the top which has a thickness of one-half meter. Mousterian implements are found in the same horizons as the faunal remains. They are made of quartzite and flint; also of cave-bear bone. The quartzites were picked up in the Weissbach valley several hundred meters below and carried to the caverns there to be worked into tools. Some of the better formed implements are made of a greenish flint that must have been brought a long distance by palæolithic man. Both stone and bone implements are of crude workmanship. In company with Herr Bächler the writer spent some hours studying the sections and searching for animal remains and artifacts. This was a few weeks before Professor Penck's visit to Wildkirchli. We were successful in finding two bone implements and one chipped quartzite. Teeth and fragments of bones were counted by the dozen. These were chiefly of the cave bear. Remains of the cave lion, the cave panther, badger, marten (*Mustela martes*), ibex, chamois, stag, marmot, otter and hermit crow have been noted.

The deposits are not indurated and may be worked with as much rapidity as is consistent with careful observation. They consist of materials that have fallen from the ceilings. They cannot be called stratified and yet more or less definite horizons may be distinguished on account of the relative fineness of the deposits and the variations in color.

When could Wildkirchli have been inhabited? It lies within the region of glaciation. It could not have been occupied during the Würm glacial period because it is at a height of 1,500 meters, while the snow-line of the Würm glacial period was only 1,200 meters. It is self-evident that man could not have taken up his abode above the snow-line. Even during the Bühl stage of the glacial retreat the snow-line was still as low as 1,500 meters. Man could only have come there after the Bühl stage. But after the Bühl stage we have a different fauna and flora; so that man must have inhabited Wildkirchli before the last (Würm) glacial epoch, that is to say, during an interglacial (Riss-Würm) epoch with climatic conditions similar to those of the present day.

During the last glacial epoch the Wildkirchli caverns were filled with ice or snow and hence no deposits of any kind were formed. The sterile layer one-half meter thick at the top of the floor deposits represents the accumulation since the close of the glacial period. If we allow 30,000 years for post-Würmian times we must allow as much more for the last glacial epoch. Thus to reach the Riss-Würm interglacial period and man's occupation of Wildkirchli caverns would mean going back about 100,000 years. We have here an atypic but pure Mousterian industry, which probably marks the close of the period; for it seems that in France, far removed from the Alps, the Mousterian industry was contemporaneous with a glacial epoch (the Riss) and is therefore much older than that at Wildkirchli.

HOMO MOUSTERIENSIS NORMA FACIALIS

HOMO MOUSTERIENSIS FROM THE LOWER ROCK-SHELTER AT LE MOUSTIER (DORDOGNE), FRANCE. NORMA LATERALIS

What manner of man was the author of the Mousterian industry? The discoveries in the cavern of Spy near Namur, Belgium, pointed as early as 1886 to the Neandertal race or so-called *Homo primigenius*. All doubt has been dispelled by M. O. Hauser's discovery last summer of part of a human skeleton, including the skull, in the classic station of le Moustier itself. This station, belonging to a wonderful series of palæolithic sites in the valley of the Vezere, France, has been known since the explorations of Lartet and Christy, 1863-65. Hauser very wisely delayed the removal of the human remains from the cavern of le Moustier until after the arrival of a party of German anthropologists, including Professor Klaatsch of Breslau, the party going direct from the German Anthropological Congress held in Frankfort during the first week in August. Here, again, we have to deal with the primitive Neandertal and Spy type, the so-called *Homo primigenius* which now also becomes *Homo Mousteriensis*. A study of the human remains from le Moustier is now being made by Professor Klaatsch.

There is, therefore, no longer any doubt as to the physical characters of man of the Mousterian epoch—man that lived in Europe 100,000 years ago. But the Chellean industry is older than the Mousterian and to the present time no human remains have been found that can with certainty be dated back to the oldest epoch of the palæolithic period. When found, if ever, they will probably be even more primitive in type than *Homo Mousteriensis*. The differences may be great enough to be considered specific as the Chellean epoch was a long one, reaching well back into the long Mindel-Riss interglacial epoch. But the Chellean industry already represents a degree of intelligence that must stamp its author as distinctly *Homo*. This much cannot at present be said concerning the author of the eolithic industry. The latter is found not only in the lower Quaternary but also in the Miocene and even in the Oligocene at Boncelles, a station recently explored by Rutot. From the Oligocene and Miocene up into the lower Quaternary the industry remained practically at a standstill, representing one and the same degree of intelligence.

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THE HIGH INTELLECTUAL CHARACTER OE PRIMEVAL MAN

DOCTOR ANDREW WILSON, in his delightful book, *The Abode of Snow,* tells us that, while crossing the Himalayas by the Pass of Schingo La, he and his party were overtaken by a violent snow storm. Struggling over the crest of the awful pass, amidst glaciers and crevasses, and buffeted by wind and snow, they at last reached a place where it was possible to encamp, and amidst the gathering darkness, the weary party fell fast asleep. At midnight, Doctor Wilson was awakened by the intense cold, and went out of his tent to look upon the scene around. The storm had ceased, and the sky was clear. Perfect stillness reigned, for the intense cold had bound up all sound and movement in its icy fetters. The moon, a little past the full, cast its pale light on the weird landscape, and the stars twinkled serenely in the dark vault of heaven. All around were stupendous mountains, clad in the purest and whitest snow, and great glaciers glittered in the ghostly moonlight. Looking upon that marvellous scene of mountain, glacier, and snow field around, and on the grandeur of the starry heavens overhead, the thought came into the traveller's mind: "What am I compared with these stupendous mountains, these awful and immutable forces of nature, these gigantic stars with systems of worlds circling around them, and this boundless stellar universe? I am a mere speck, a frifling point, an insignificant unit."[1]

Similar thoughts seem to have filled the mind of David, as, gazing on the starry heavens, he exclaimed: "When I consider Thy heavens, the work of Thy fingers, the moon and the stars, which Thou hast ordained; what is man that Thou are mindful of him? and the Son of Man, that Thou visitest him?"[2] The immensity of the creation around and above him overwhelmed him, and he felt that he was a mere speck amidst such boundless space, and such countless worlds. But he soon realized that the greatness of man lay in his reason and spirituality, for he proceeded: "Thou hast made him a little lower than the angels, Thou hast crowned him with glory and honor. Thou hast madest him to have dominion over the works of Thy hands. Thou

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[1] *The Abode of Snow*, pp. 280, 281.

[2] Psalm viii.

hast put all things under his feet." Thus David rightly perceived that man's position in nature must be determined by his mental and moral powers, and by his works. The noblest thinkers in all ages, have followed the same line of reasoning. Kant, the great philosopher of Königsburg, gives his opinion on the question in the following words: "Two things fill my soul with an admiration and a veneration, ever new and ever increasing; the starry heavens above me, and the moral law within me. I am not compelled to look for these two grand sights through the covering of a mysterious obscurity, nor to ascertain them vaguely at an infinite distance. I contemplate them immediately before me; they are bound to the very consciousness of my being. The one, the visible heaven, begins at the very point of the Universe where I am, and widens around me in circles of worlds, in systems of systems up to the infinitude of spaces and of times in which these worlds are situated. The other, the moral law, equally starts from my invisible self; it places me in the midst of the intellectual universe, that other infinitude with which my personality stands in a necessary relation. And while the first (the sight of the heavens) annihilates my personal importance, the second (the fact of the moral law) raises to the infinite the worth of my personality; since that law manifests in me the existence of a life completely independent of my animal life, and of the world of sense."

Lord Beaconsfield held similar opinions. In discussing the idea, that science by demonstrating the insignificance of the earth in the vast scale of creation has strengthened modern infidelity, he says: "Science may prove the insignificance of this globe in the scale of creation, but it cannot prove the insignificance of Man. What is the earth compared with the sun? A molehill by a mountain; yet the inhabitants of this earth can discover the elements of which the great orb consists, and will ere long ascertain all the conditions of its being. Nay, the human mind can penetrate far beyond the sun. There is no relation therefore between the faculties of man and the scale in creation of the planet which he inhabits." [3]

Such is the true way of determining man's position in nature. Comparative anatony can tell us but little. It merely deals with the *lower* or *inferior* portion of man. The mental and moral faculties of man have to be examined, and it is from the character and actions of these, that we conclude that man possesses a spiritual nature, and had a supernatural origin. The sense of duty; the voice of conscience; the power of reason; the marvels of memory; the pleasures of the imagination; the joys of hope; and above all the strength and permanency of the religious instinct, carrying with it as it does, the craving for immortality, all these combine to show that man had a supernatural origin in the past, that he possesses a supernatural nature

[3] *Lothair*, p. 409.

in the present, and that he will enjoy a supernatural existence in the future.

But at this point we are met with an objection, which every student of human nature is bound seriously to consider. We are told that the revelations of modern science have entirely altered our views on the character and origin of man. These discoveries have proved that man is nothing but an improved ape, and that his distant ancestors were purely bestial. From this degraded primitive state, in which he was more debased than the lowest of existing savages, he slowly raised himself by a long struggle with nature which lasted for ages. The lowest savages now existing therefore, have some resemblance to the earliest men, although even they are not degraded enought to reveal to us the earliest human beings. It is all very well—so we are told—to prove man's supernatural origin and destiny from our mental and moral faculties, but we take our examples from men as they exist *now.* The earliest men revealed to us by science, did not possess these mental and moral faculties for they are the result of long and slow development. Moreover, so the objectors continue, the lowest savages—who represent primitive man—do not possess these mental and moral faculties either. Hence it is that the argument altogether fails. Those high mental and moral faculties which civilized men possess were not inherent in the earliest members of the human race, but are the result of a long development, and they have been slowly acquired during a long struggle with adverse circumstances, which has lasted for ages.

Is this a fair statement of the results of scientific research as far as man is concerned? We think not.

Why are we to suppose that present savages represent the earliest men? Because, we are told, man slowly raised himself from ape-like progenitors by a long and painful struggle. But this is the very point in discussion, and it has to be *proved,* and not *assumed* at the beginning of the discussion. The debate cannot be allowed to begin by a *petitio principii,* for we *require* satisfactory *reasons* that man had ape-like ancestors. Besides all this, if the lowest savages are now nearly in the condition of the earliest men, how have they not raised themselves from this state? Why have they fallen behind, when other men have risen? They have, by the hypothesis, lived *longest* on the earth, therefore they ought the more surely to have advanced from their primitive state, and not to have remained stationary. Two great facts show that these lowest savages are as really and truly men, as their more civilized brethren. *First,* the fact that there is the power of improvability amongst the lowest savages. *Secondly,* the equally certain fact that degradation has for a long time affected these most debased races of mankind. Who are the most degraded amongst savages? We are of course referred to the Australians, the Bushmen, the Andamaners (*Mincopies*), the Veddahs, and the Fuegians. It is however

strangely forgotten that all these savages possess a *wonderful capacity for improvement,* which can be drawn out by education, and this shows that they are as much men as are the cultured Europeans of the present day. Thus the Australians are so intellectual that in Queensland they have been taught to make excellent police. They have been taught to play chess, and the children quickly learn in the English schools. Their paintings also on the rocks in many parts of Australia show marvellous artistic powers. The degraded Bushmen of the South African desert have the highest intelligence of all the savages of that region. They are fond of music and singing, and they are also very skillful in painting and drawing. Then take the Fuegians. They are thought to be the lowest representatives of humanity. But what are the *real* facts? Through the zealous laborers of the members of the South American Missionary Society, they have been reclaimed, taught to read and write, and have been instructed in all the arts of civilization. Darwin himself admitted that the progress of Fuegia was the most wonderful thing he had ever heard of. It is exactly the same with the Veddah of the Rocks in Ceylon. No one in the present day, will maintain that the Eskimo are a degraded people. They only live in the manner that their Arctic home compels them to live. They have been taught to manage English sailing vessels and to play musical instruments so as to develop correct tunes and airs. The successful labors, also, of the members of the Church Missionary Society, have shown how their moral character can be developed. These labors have been chiefly in the regions around Hudson's Bay, but the work of the Danish Missionaries amongst the Eskimo in Greenland, further testifies to their moral improvability. Then, let us take the case of the Mincopies, the black dwarfs of the Andaman Islands. The worst charges brought against them in former days, have now been shown to be false. Professor De Quatrefages, in a recent work[4] has collected—in a review of the labors of Mr. Man—a mass of interesting information relating to the Mincopies, and comes to the conclusion, that their mental and moral characteristics, are of a high order. Unfortunately they are being corrupted by the pernicious influence of white convicts and traders.

Another interesting fact concerning modern savages, is, that most of them show, in their habits and traditions, clear proofs that their ancestors were once in a far higher state of development than they themselves are at present. Take one line of evidence alone, that of language. Here we may draw attention to the remarkable paper of Mr. Horatio Hale called *Language a Test of Mental Capacity.*[5] In this the author maintains that language is the true ground of

[4] *Les Pygmees.*

[5] This paper was read at the annual meeting of the Royal Society of Canada, and was published in the *Transactions of the Royal Society of Canada*, Vol. IX, Sec. II, 1891.

AUSTRALIAN TYPES

1, 2, Making Fire with a Stick. 3, Throwing Boomerang. 4, Throwing "Nullah-Nullah." 5, Warrior of Workii Tribe, Queensland. 6, Clarence River Warrior, N. S. W. 7, Chief of Bombala Tribe, N. S. W. 8, Chief of Karundee Tribe, Queensland.

anthropological classification, and proceeds to examine the languages of barbarous races in succession. He shows from their complex language, that the Australian aborigines originated in the cultured races of the Dravidians of India. In the same manner the languages of many of the American aborigines prove that they are the savage descendants of cultured ancestors. On the improvability of the Australians, also, Mr. Hale draws attention to the remarkable work of two Spanish Benedictines. Fathers Serra and Salvado, who established a native settlement in Western Australia. One of the girls of the Aborigines educated here, holds an office in the postal and telegraph service of the West Australian Government. The boys learn well, and become good workmen, as capable as the whites. That the native Australians are descended from the cultured Dravidians admits of little doubt, the similarity between the Dravidian and Australian languages strongly confirming this theory. Mr. Hale sums up the result of his inquiries in the following striking words: "The result of our inquiries—a result deduced alike from the evidence of language and that of history—is that a state of barbarism does not imply any inferiority in intellectual power. It simply indicates that the barbarous people have been compelled to live amid surroundings which rendered any advance in culture impossible. Remove the savageAthabascans to the bountiful pastures and fertile valleys of New Mexico, give them horses, cattle, and sheep to tend, and wheat

and fruits, and edible roots to cultivate, and presently their torpid faculties rebloom, and they become the quick-witted and inventive Navajos. Remove the shrewd, industrious, enterprising, improving Dravidians to the barren plains of Australia, and they sink in time to what has been deemed the lowest level of humanity.

"This naturally leads us to consider some of the theories which have lately been put forth in regard to the condition and character of primitive man. Strange to say, the modern representatives of this unknown individual have been looked for in places where, by the common consent of all physiologists, he could not possibly have come into being—in Australia, in South Africa, in the Pacific Islands, and in America. Many works have been put forth in which speculations, based entirely on what has been learned of the inhabitants of these regions (but generally in utter disregard of the teachings of linguistic science) have represented the earliest men as sunk in the lowest debasement of mind and morals. * * * But if the conclusions drawn from the facts recorded in the previous pages of this essay are correct, all these peculiar usages of barbarous tribes are simply the efforts of men pressed down by hard conditions below their natural stage, to keep themselves from sinking lower, and to preserve as far as possible the higher level of intellectual, moral, and social life, to which their innate faculties tended to exalt them. They are like the struggles of a bird in a cage to keep its wings in use for flight. A child who should assume that the primitive canary could only flutter for a distance of a few yards, would be as wise in its inference as the philosopher who regards the Australians and the Fuegians as representatives of primitive man. The physiologist sees at a glance in the structure of the bird's wings the kind of flight for which it was intended, and the philologist discerns in the Australian and Fuegian languages, evidences of the mental endowments, which, under other circumstances, would have placed the speakers of those idioms very far above their actual condition."

It is interesting to notice, that Dr. Alfred Russel Wallace, who is a supporter of the Darwinian theory, except as concerning man's origin, comes to a similar conclusion. In a recent paper in *The Fortnightly Review*,[6] he maintains that the progress of modern civilization, does not prove the mental superiority of the men of the present day, over the men of the earliest ages. He says: "Our intellectual and moral nature has not advanced in any perceptible degree." He further maintains that savages, "when sympathetically studied, are found to resemble ourselves in their inherent intellectual powers," which is proved by their "complex language, their elaborate social regulations, and often by an innate nobility of character." All this tends to show, according to Doctor Wallace, the absolute necessity of *moral evolution*, and development of *character*, which is the true human nature, as opposed to mere materialistic knowledge.

[6] *January*, 1908.

It is precisely in this moral nature, that, if perverted, is found the secret of that degeneration, which, coupled with adverse physical conditions, has brought so many savage races, into their present state of degradation. Do we not, again and again, see *individuals,* although possessing wealth and culture, sink into a state of degradation and poverty, simply because they have yielded to the promptings of their lower and baser nature? Turning a deaf ear to the calls of duty, and to the warnings of conscience, they have gratified the cravings of their animal passions, and, as a result, they have lost wealth, character, health, and ultimately, life itself. As it is with the *individual,* so it is with the *race.* In the struggle for existence races become degraded and at last die out, because through moral excesses their constitutions were so weakened, that they were overcome by stronger invaders. The weaker were then driven into inhospitable regions, where, suffering in body and mind through moral excesses, adverse physical conditions completed their ruin. The late Duke of Argyll, in one of his latest works mentions the three great causes, which occasion man's degeneration, enumerating them as follows: *First,* the yielding to the animal passions within the soul; *secondly,* internecine conflict, springing from ambition and love of power; *thirdly,* adverse physical and geographical conditions. All these, he powerfully shows, combine to produce the degradation of races who were once more cultured and civilized than they are at present.[7] These views are also powerfully maintained, by one whose writings cannot be surpassed in the English language for beauty of expression and for graphic power of description, I allude to Hugh Miller. After discussing the decay and degradation of the lower races, Miller pertinently asks the following question, which he answers in his own graphic and picturesque manner:

> If man, in at least the more degraded varieties of the race, be so palpably *not* what the Creator originally made him, by whom, then, was he made the poor, lost creature which in these races we find him to be? He was made what he is, I reply, by man himself; and this, in many instances, by a process which we may see every day taking place among ourselves in individuals, and families, though happily not in races. Man's nature, again—to employ the condensed statement of the poet—has been bound fast in fate, but his will has been left free. He is free either to resign himself to the indulgence and self-indulgence so natural to the species; or "spurning delights, to live laborious days;" free either to sink into ignorant sloth, dependent uselessness, and self-induced imbecility, bodily and mental, or to assert by honest labor a noble independence—to seek after knowledge as for hidden treasures, and, in the search, to sharpen his faculties and invigorate his mind. And while we see around us some men addressing themselves with stout, brave hearts to what Carlyle terms, with homely vigor, their "heavy job of work," and, by denying themselves many an insiduous indulgence, doing it effectually and well, and rearing up well-taught families in usefulness and comfort to be the stay of the future, we see other men yielding to the ignoble solicitations of appetite or of indulgence, and becoming worse than useless themselves, and the parents of ignorant, immoral, and worse than useless families."[8]

[7] *The Unity of Nature,* pp. 407-448.
[8] *The Testimony of the Rocks,* pp. 255, 256.

Hugh Miller gives a striking case to prove this. He refers to the plantation of Ulster in 1611, and to the successes of the British against the rebellious Irish in 1641 and 1689. At these times multitudes of the native Irish were driven into the mountains. Here they fell victims to the great brutalizers of the human race, hunger and ignorance, and their descendants for a long time exhibited a state of great degradation. Such instances must have occurred again and again, in the early ages of the human race, and they are constantly taking place among barbarous communities in the present day. These facts help us to understand, how savage races of men may be the descendants of ancestors, who, in the remote past were more cultured and civilised, than are their degraded descendants who live in the present time.

We are, however, in this paper, principally concerned with primitive man, and with his intelligence, so we will pass at once to this branch of our subject.

The first question to be answered is: "When did man appear upon the earth, and where are his earliest traces to be found?" We do not consider it necessary to discuss the question of Tertiary man, because our best geologists deny that man existed in the Tertiary period. And with good reason, for there has not been a single bone or skull of man found in any Tertiary deposit. The so-called Pliocene men whose relics were found at Casteluedolo near Brescia, are now abandoned, and the imaginary "cut bones" are not considered now to be the works of man. The rude flints of Thenay, Otta, and Puy-Courny, which were formerly thought to be of human workmanship, are now held to be merely formed by natural causes. Sir John Evans, our greatest authority on flint implements has most emphatically rejected these so-called "evidences" of the earliest existence of man,[9] and the Marquis De Nadaillac, one of the best of French archæologists, after enumerating all the so-called "proofs" of man's existence in the Tertiary period, rejects them all,[10] and in this conclusion, he is supported by most of the leading men of science in France. M. Lapparent, speaks contemptuously of the "legends of Tertiary man." [11] In Germany also, Tertiary man, is not accepted and M. Hugo Obermaier has even thrown grave doubts on many of the recent discoveries of man's remains, which had formerly been accepted as genuine.[12]

But even if we accept the rude fragments of flint which are found in the Tertiary beds as having been made by man, would that justify us in concluding that their makers were more degraded and nearer to the apes than are any savages now living? Certainly not. All

[9] *Ancient Stone Implements of Great Britain*, 2d Edition, p. 658; also *Address to the Anthropological Society of Great Britain*, 1890; also *Address to the British Association at Toronto*, pp. 8, 9.

[10] *L'Homme et le Singe*, pp. 57-64.

[11] *Les Silex Tailles et l'Anciennete de l'Homme*, pp. 19-24.

[12] See *Anthropologie* t. XVI (1905) and t. XVII (1906).

the experience which we have gained from our knowledge of modern savages, teaches us that it is perfectly useless and misleading to judge the mental and moral condition of barbarous races, from the rudeness of their weapons and implements. Let us take a special case, that of the Tasmanians, who finally became extinct in 1877. Their weapons were of rudely chipped stones, which were so rough that they strikingly resembled those used by primitive man in the Palæolithic Age. Speaking of the weapons of the earliest men, Dr. E. B. Tylor, said, that even a lower type of weapons than those of the Palæolithic Age had been used by the Tasmanians. These tools were never handled, the makers of them had no bows and arrows, and were perhaps the lowest of *all* living savages, spending their time in wandering about and having no settled abodes.[13] What are the real facts about these Tasmanians? They belonged to the Australian family of Polynesian races, but they were physically very superior to the Australians. Their average cranial capacity was 1348 cubic centimetres,[14] so that they had larger brains than the Eskimo of Western Greenland, and not only so, but the brains of these Tasmanians were much larger than those of the Peruvians, who were the most civilized race in ancient America! The language of the Tasmanians resembled that of the Australians, which has been declared by Hale to show much former culture and civilization, for he says: "The Australians, whom some too eager theorists have accepted as the best representatives of Primeval man, prove to be the offspring of one of the most highly endowed races of Southern Asia" [15] (i.e. the Dravidian). In India the Dravidians prior to the Aryan invasion occupied nearly the whole of India, and at the present time the Dravidian race is supreme in the south of the peninsula and nearly 50 millions of people in India now speak the Dravidian language. The fact that the Australians and the Tasmanians are members of the *same race,* leads us more fully to consider the anthropological condition of the former, and on this, again, we may listen to the striking words of Mr. Hale, who says:

> The Australians have been accepted by some distinguished members of the Darwinian school (though not by Darwin himself) as the best surviving representatives of the earliest men of the present human species. Their reasoning may be stated succinctly in a syllogistic form as follows: The earliest men of the existing species must be supposed to have been the lowest of men in intellectual capacity, and in social condition. The Australian aborigines are now the lowest men in intellect and in social condition. They must therefore be deemed to represent more nearly than any other race the character and social condition of the earliest men.
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> Both premises assumed in this reasoning are mere assumptions, which are not only not based upon facts, but are opposed to the clearest indications derived

[13] *Presidential Address to the Anthropological Section of the International Oriental Congress* in 1892.

[14] Topinard, *Étude sur les Tasmanies*, p. 327, and *Crania Ethnica*, by MM. De Quatrefages and Harny, p. 233.

[15] Hale, *op. cit.* p. 443.

from the actual data we possess. There is no better reason for supposing the earliest men of the present species to have been low in intellectual capacity, than there is to suppose them to have been small in stature and physically weak. The men who combated and overcame the monsters of the Quaternary Era, the mammoth, the cave-bear, and the cave-lion, and whose earliest historical offspring reared the vast architectural piles of Egypt and Assyria, must have been as vigorous in mind as in body. As for their supposed modern representatives the Australians, it is astonishing that highly educated men, professors of philosophy, who undertake to treat of the intellect of a race, should refuse to consider that prime and incomparable exponent of intellect, the language.[16]

That the native Tasmanians were capable of being civilised, and of assimilating European culture, has been proved beyond all doubt. In the schools the Tasmanian children, were, on the whole, fully equal to the children of the whites. M. De Quatrefages, also, gives a striking account,[17] of a civilized, genuine Tasmanian called Walter George, who had received at school an English education, and had profited by it in a remarkable manner. George lived in a neat English house, which his wife,[18] kept scrupulously clean. He wore European clothes, spoke the English language, and had not the least vestige of savagery. He read the daily newspapers, and had a little collection of books, amongst which the Bible occupied the foremost place. His manners were polite and affectionate, and he was quite a representation of an English gentleman. After this, no one with any knowledge of the case, would dream of calling the Tasmanians a degraded and brutal people, rather must we join with Governor Arthur in declaring that we are compelled to consider the Tasmanians to have been a simple but brave race, endued with "noble instincts."[19]

But let us now consider closely the intellectual character of the men of the Quaternary Period, since in this era we have so many traces of the earliest members of the human race, that we can more easily and fully ascertain their mental development.

In the Quaternary Period we find the great Ice Age or the Glacial Period, and it will be best to adopt the simple division of the Quaternary Epoch, which subdivides it into, Pre-Glacial, Glacial, and Post-Glacial Periods. Let us first assume that man was of Pre-Glacial origin, and that he appeared in Great Britain during that mild and genial time, which preceded the Glacial Period.[20] If this were the case, what became of Quaternary man in Great Britain during the Glacial Era, when England and Scotland were overwhelmed by vast ice sheets, and were buried as Greenland is now, hundreds of feet beneath an enormous *Mer-de-Glace* of moving ice?

It is generally replied that man in Northern Britain migrated to the warmer regions of the south, where he lived until the Glacial

[16]Hale, *Op. cit.*, p. 433.
[17]*Hommes Fossiles et Hommes Sauvages*, pp. 354, 355.
[18]A half-caste.
[19]*Daily Life and Origin of the Tasmanians*, by James Bonwick, p. 9.
[20]This is the opinion of M. de Mortillet in his *Le Prehistorique Antiquité de l'Homme*. Deuxième Edition, 1885, pp. 227-251.

Period had passed away. Let us consider what this implies. *Why* should man migrate? Either from want of food, or from internecine warfare. How came the earliest men in Britain to know that there was a warmer region? How did they understand that it lay in the *south?* And how did they find out its *direction,* and discover the *way* thither? It is easy for *us* to know these things now, but if Quaternary man knew them, he must from the beginning have been in the *fullest possession* of human faculties. He must, in fact have been as truly man, as we are now. How did man in Britain cross the channel? If he constructed boats, he must have been both a brave and a skillful navigator. If however, he waited until, owing to the extreme cold of the Glacial Period, the English Channel was frozen over, then he must have crossed on *sledges.* Here again, he exhibited a marvellous triumph of inventive genius, and truly human adaptability to the change of climate and conditions. Arrived in France, the earliest men, must have found themselves in a region of impenetrable forests, through which their rude stone weapons could not cut a way. They must therefore have used the rivers, by means of boats and rafts, as M. Dupont maintains,[21] or advanced by means of sledges, if the rivers were frozen over. At the same time they must have invented an elaborate system of *clothing,* to provide themselves with protection against the increasing cold. Thus moving southwards, along the courses of the Saone and the Rhone, they reached the shores of the Mediterranean, where, as the climate was milder, we may suppose that they halted. All these complicated movements imply the highest human intelligence.

When the Glacial Period had passed away, primitive man again entered Great Britain. Why did he do so? Why did he leave the warm coasts of the Mediterranean and once more penetrate into the savage and inhospitable regions of the North? There can be only one answer to this question. The most cultured races of men in primitive times lived in the warm southern regions, and as they increased in numbers, they, by force of arms, *drove* the weaker tribes into the gloomy regions of the north. Thus, we must look far to the south for the earliest men, and we are compelled to admit with Sir William Dawson,[22] that even in the *earliest* times of the Quaternary Period, cultured races and civilised communities, lived along the eastern shores of the Mediterranean Sea. Such a conclusion gives the death blow to the theory of the bestial degradation of primitive man.[23]

But now let us look at the question in another light. Let us suppose that when the Glacial Period prevailed, man did not leave Great Britain, but remained where he was and braved the terrors of the Great Ice Age. What follows from this? During the Glacial

[21] *L'Ethographie de l'Homme de l'Age du Renne,* p. 71.
[22] *The Meeting Place of Geology and History,* pp. 203, 204.
[23] See *The Unity of Nature,* by the late Duke of Argyle, pp. 422-426.

Period, Great Britain was covered with a vast continuous sheet of moving ice, more than 1,000 feet in depth. A narrow fringe of land alone along the southern coast of England was permanently free from ice. But this must have had a very severe snowfall in the winter, during which time the English Channel must have been frozen over.[24] Greenland, at the present day, must be much like England in the Glacial Period, though probably a hardy, though scanty vegetation, flourished between the border of the ice sheet, and the English Channel. In Greenland, the habitable land consists of a mere fringe from 5 to 25 miles in thickness, between the sea and the inland ice. The interior is a frozen desert, some 1,200 miles in length and 500 miles in breadth, and is a vast mass of solid ice, and spotless snow.[25] If Quaternary man in Great Britain, therefore, remained where he was during the Glacial Period, he must have lived on the mere fringe of habitable land, which, as it does now in Greenland, existed between the inland ice and the English Channel.

Let us see what this involves. First, Quaternary man must have changed his manner of living as the climate grew colder, until his life was like that of the Eskimo. He must have given up building wooden wigwams, and for the future he must have constructed snow houses. Formerly he was clad in skins, but now he dressed himself in furs, and, having invented a new kind of clothing, he was compelled to cover himself with it in a different manner. New kinds of food had now to be discovered, which were obtained in a different manner. Formerly Quaternary man hunted the elephant, the rhinoceros, and the hippopotamus, now he was compelled to kill the seal, walrus, the musk-ox, and the polar bear. The capture of the former animals made him adopt a sea-faring life, which was quite new to him. New kinds of boats had also to be invented, for the frail canoes which were used on the rivers had to be abandoned, and strong boats, like those used by the Eskimo, had to be constructed. Now, all this shows a splendid triumph of human intelligence over the powers of nature. In order for primitive man to achieve this triumph he must have been in possession of *genuine human faculties* at the beginning of his existence. The earliest men in Northern Europe, must have possessed a marvellous mental power to have maintained themselves amidst the terrors of the ice sheets and glaciers of the Glacial Period. They were as truly men as are the skilful Eskimo, and were no nearer to the apes than are these intelligent denizens of the Arctic Regions, who have been taught to manage English vessels, to sing from notes, and to acquire all the elements of modern civilized education.[26]

[24] See the map of the Great Ice Sheet of Northern Europe in Professor J. A. Geikie's *Prehistoric Europe.*

[25] The best description (in summary) of Greenland that I know is given by Peary in his *Northward Over the Great Ice,* Vol. I, pp. xxix-xxxvi.

[26] The reference is chiefly to the wonderful progress made by the Eskimo in the Danish settlements in Greenland. See illustration, page 53.

ESKIMO IGLOO OR HUT IN THE EXTREME NORTH OF GREENLAND ON THE NARROW LAND-BORDER BETWEEN THE OCEAN AND THE GREAT ICE CAP. *Photo by Dr. Libbey*

If it be maintained that man entered Northern Europe, only *after* the Glacial Period had passed away, we ask, "*why* did man enter such a rough and savage region, and why did he leave the warm and sunny southern lands, around the Mediterranean Sea?" The reply must be that he was *driven* to do so. Stronger and more cultured races *drove* him northwards. Hence, we again reach the conclusion that the earliest men were in a high state of intelligence, and the men whose remains have been found in the Quaternary beds of Northern Europe, were in all things as truly men, as we ourselves are to-day.

A further evidence of the high intelligence of primeval man, is found in the manner in which he maintained himself against the swarms of monstrous and ferocious beasts by which he was surrounded. Not only did he hold his own against them, but even, so we are told, he actually exterminated many of them.[27] We must remember, also, that man achieved this astonishing victory over these mighty animals, by means of *stone* weapons, which were of the *rudest possible* character. His triumph, therefore, was solely due to his wonderful

[27] This is the opinion of Professor Boyd Dawkins. See *The Popular Science Review*, Vol. VII, pp. 285, 286.

intelligence. Let us examine this point closely. The great beasts of the Quarternary Period were far more numerous and terrible than any which have lived on the earth during the Historic Era. The cave-lion, the cave-bear, and the cave-hyæna, were far larger and stronger than any lions, bears, and hyænas, which live now. The terrible sabre-toothed tiger (*Machairodus*) was a more fearful beast to encountry in Quaternary times, than any carniverous animal that lives at the present day, and to those animals already mentioned, must be added, the wolf and the leopard. And yet, against these gigantic and blood-thirsty beasts, man waged a triumphant warfare, with the *rudest* and *feeblest* of stone weapons! Never, since his advent in the world, has man been such a "mighty hunter," and never has he demonstrated his power over the animal world so grandly, as he did in the earliest ages of his existence, during the Quaternary Period. In a popular scientific work,[28] there is a picture which strikingly portrays the warfare which primitive man carried on against wild beasts. Man, armed with rude weapons is defending himself against the attack of bears and hyænas, while the remains of some are cooking on his fire, showing the victories that he has gained. Herbiverous animals, such as the elephant, rhinoceros, and wild horse, form the background of the picture.

It is true that the diminutive Bushmen of South Africa have maintained themselves against the swarms of savage beasts by which they are surrounded,[29] but then, they use, and always *have* used weapons of *iron*. More than this, the intelligence of the Bushmen far surpasses that of any of the natives of South Africa, as in music, dancing, and drawing, they have no equals in all South Africa, while as hunters, their skill and daring are simply amazing. They do not hesitate to attack the lion, in the most fearless manner, and they are nearly always victors.

Let us think of the *weapons*, with which the earliest men attacked the mighty beasts with which they were surrounded. These weapons were all of *stone*. Foremost of all was the hatchet, then the spear; and lastly the knife and the dagger. Let us reflect upon the difficulty in giving these weapons a proper cutting edge, and the equal difficulty of handling them properly. These would form serious obstacles to striking a heavy blow. One weapon of power primitative man did possess, and that was the *bow*. It needed the greatest ingenuity to invent it, and to bring it to such a perfection that it became a most dangerous weapon, in fact the discovery of the bow, has been called by a talented writer,[30] the most wonderful of all human inventions. Nevertheless, the arrows used by the earliest men show that they were of imperfect form, as they were neither barbed nor stemmed.

[28] *The World Before the Deluge*, by Louis Figuier, p. 406.
[29] Chiefly of course before the advent of the whites and the introduction of fire-arms.
[30] Professor W. I. Thomas in his learned work, *Sex and Society*.

HANS EGEDE, THE FIRST MISSIONARY TO GREENLAND. PAINTED BY RASMUSSEN, A NATIVE ESKIMO

Photo by Dr. Libbey

It is however, very striking that some were constructed in such a manner, as to show that the earliest men in the Quaternary Period, used *poisoned* arrows.[31] Now, the construction of a poisoned arrow, is a great triumph of human intelligence. The poison has first to be discovered, and then its effects on wild beasts has to be observed. Next, it has to be prepared, and its proper degree of strength has to be calculated. Various kinds of poisons have to be classified, and their effects on different animals must be carefully observed. The Bushmen of South Africa, who are the greatest hunters in the world, cover the iron heads of their arrows with poison, and form the arrowheads in such a manner that they become detached in the body, on any attempt being made to withdraw them from the wound.[32] The Bush-

[31] *Les Invasions Paleolithiques*, par. M. Girod, pp. 55, 57. M. Girod also figures these (bone) arrow-heads in plates X, XII, at the end of his book.

[32] *The Natural History of Man*, by Rev. J. G. Wood, Vol. I, p. 284.

men (according to Livingstone [33]) use two kinds of poison, one of an animal and the other of a vegetable character, and other poisons are frequently added to the compound, in order to increase its deadly nature. Every one knows that the intelligence of the Bushmen is amazing, and we shall afterwards refer to their wonderful powers of drawing, and singing. That primitive man used poisoned arrows is admitted by Sir John Evans,[34] and the proofs that these deadly weapons were employed in primeval times are steadily increasing. Here, then, in the use of poisoned arrows, is another unanswerable evidence of the high intelligence of the earliest men.

But the darts and arrows of primeval man were of no avail against the mighty fur clad mammoth and hairy rhinoceros, for these ponderous beasts were thoroughly protected against such puny weapons. Nevertheless, the earliest men killed these mighty beasts. How then did they slay these gigantic animals? Evidently by means of snares and pitfalls, and by the use of such traps as are now employed by the natives of South Africa. Livingstone has described these pitfalls at length. One of them, called the "Hopo," is a deep pit at the end of two long converging fences, between which the animals are driven, until they fall into the pit at the extremity.[35] Other traps consist of darts suspended overhead, and of cords for entangling the legs of the animals. Now, the larger animals, such as the Mammoth and woolly rhinoceros, were doubtless taken by primitive man in this manner. A talented French writer has pictured the earliest men, ensaring the Mammoth in a great pit, and smothering it by means of fire.[36] He also gives an illustration of a herd of wild horses being driven by the hunters over a high cliff, so that many were killed by the fall.[37]

Now, all this elaborate construction of traps, snares, and pitfalls, implies a very high state of mental intelligence and ingenuity. Each snare could only have been constructed after the nature of the animal to be entrapped had been carefully observed. After many attempts and failures also, the snare must have been perfected, for the hunters must have been always improving on their inventions. The faculty of primitive man, therefore, for observation, calculation, and invention, must have resided in his nature from the *very beginning,* so that at the very commencement of his existence, man must have been as *truly man* as he is in the present day.

But here it may be asked: "How do we know that the earliest men really overcame such mighty beasts, and what evidence is there to show that they slew the strongest and largest animals then living?"

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[33] *Missionary Travels in South Africa,* p. 171.
[34] *Ancient Stone Implements of Great Britain,* 2d Edition, p. 361.
[35] *Missionary Travels,* p. 26.
[36] *Solutré, ore les Chasseurs de Rennes,* par Adrien Cranile, p. 128.
[37] *Ibid.,* p. 96. This book is a work of the imagination, but it possesses great scientific value.

The answer is given by the relics found in the caves, and by the hunting scenes carved by primitive man on horn, ivory, and slabs of slate. In many caves in France and Belgium the bones of the lion, elephant, rhinoceros, and hippopotamus, have been found mingled with ashes of fires, and with flint knives, the bones show that they had been cut and broken by human hands. Thus, in the "Doctor's Cavern," in the valley of the Rona, in Belgium, there were two distinct bone beds containing the remains of at least 250 individual animals. These were, the lion, bear, hyæna, elephant (Mammoth) and rhinoceros. These animals had, according to MM. Fraipont and Tihon, who first explored the cave, all been killed by man and cut up outside the cavern, and the severed parts were then brought inside by man to be eaten.[38] Flint and bone weapons, used by the hunters, lay amidst the bones and ashes. In the cave of Goyet, also Dupont found the bones of the lion, hyæna, bear, elephant, and rhinoceros, mingled with human weapons of the hunters,[39] and Dupont maintains that man killed and ate these great beasts, taking the larger ones by means of snares and pitfalls.[40] Again, in the cave of Brassempouy in Western France, the bones of the elephant (Mammoth), rhinoceros, and spotted hyæna, were found lying around the ashes of a fire.[41] A wonderful burial ground has been discovered at Solutré in Western France. Here lay skeletons of the earliest men of the Quaternary Era.[42] Fires had been made amidst the graves, and amongst them lay the bones of the elephant, wild ox, and hyæna. These had been killed, and eaten by man at his funeral feasts, and arrows and spear-heads of flint lay close by. Pictures also portraying hunting scenes, carved on bits of horn, and slabs of slate, have been found amongst the relics of the earliest men. One of these shows a man attacking a wild bull (i. e. aurochs,[43]) and another represents some reindeer taken in a trap or pitfall.[44] Another carving depicts a man hunting wild horses, and, as on the other side of the piece of horn on which this scene has been engraved, two bisons' heads appear, it is plain that these mighty animals were regularly hunted by primeval man.[45]

Now, tribes of hunters are usually characterised by the greatest intelligence, and by a very high mental development. Thus the Monbuttoos of Central Africa are a nation of hunters, and they are the most intelligent and cultured of all the natives of Central Africa.[46] The intelligence of the Bushmen, who live exclusively by hunting, is also well known, and the Arctic Eskimo furnishes another example.

[38] *Explorations Scientifiques des Cavernes de la Vallée de la Mehaigne*, p. 41.
[39] *L'Homme pendant les Ages de la Pierre*, pp. 107-121.
[40] *Ibid.*, p. 185.
[41] *Bulletin de la Societé d'Anthropologie de Paris*, p. 641.
[42] *Etudes sur la Station Préhistorique de Solutré, par M. l'Abbé Ducrost et M. le docteur L. Lartet.* Tome I, p. 7, 1872.
[43] *Les Invasions Paleolithiques*, par. M. Girod, plates xix, xx.
[44] *Early Man in Britain*, by W. Boyd Dawkins, p. 215.
[45] *Reliquiæ Acquitanicæ*, B. Pl. 2, Fig. 5.
[46] See *The Heart of Africa*, by Sweinfurth, Vol. II, p. 299.

Like these denziens of the Polar Regions, the earliest men killed the seal, hunting it probably in canoes with harpoons; figures of seals have been found engraved on reindeer horn and on a bear's tooth, the former having been found in the cave of Montgaudier,[47] and the latter in that of Duruthy.[48] From the same cavern comes a grand hunting trophy, for, close to a human skull, were found 40 canine teeth of the bear, and 3 of the lion. All these teeth were perforated for suspension, and on some of them figures of animals were carved. They evidently formed part of a necklace, which had been hung round the neck of the individual whose skull lay near, and who had killed these mighty animals.[49] Professor Traipont gives a graphic description of the way in which the earliest men hunted the mighty beasts of those days.[50] Dwelling on the rudeness of the earliest stone weapons, he depicts the snares, traps, and pitfalls in which the great animals were taken; then he shows how they were cut up where they were killed, and parts of their bodies carried into the caves, where the hunters held their feasts.

We need not pursue this branch of the subject farther. Enough has been said to show how with the rudest of stone weapons the earliest men conquered the gigantic animals which swarmed around them. This was a splendid triumph of human intellect, and it unanswerably demonstrates the high intellectual character of primitive man.

[This article will be followed by one on the High Artistic Power of Primeval Man.]

D. GATH WHITLEY.

Baldhu Vicarage, Scorrier, Cornwall.

[47] *La France Préhistorique*, by E. Cartailhac, p. 82.
[48] *Ibid.*, p. 73.
[49] *Early Man in Britain*, by W. Boyd Dawkins, p. 227.
[50] *Les Cavernes et leurs habitants*, pp. 84-88.

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EDITORIAL NOTES

HARVARD EXPEDITION TO SAMARIA.—"The Harvard expedition to Samaria has begun operations at the modern village of Sebastiyeh."

GLASS IN ANCIENT EGYPT.—According to F. W. von Bissing, Egypt was the only country where glass was manufactured before the Greek period. The earliest fragments bear the name of a king of the early dynasties, but the highest development took place during the XVIII dynasty.

PRESERVATION OF ANTIQUITIES IN PANAMA.—We are always glad to hear of interest taken in local antiquities, especially in less known regions. So it is with pleasure that we note that the Congress of Panama has appropriated $5,000 for the purchase of "antiquities of stone, pottery, pre-Columbian jewelry and other objects representing the works of the aborigines of the American continent. Articles of the epoch of the conquest of the continent by the Spaniards, the civilization of that period, and samples of material products are also to be acquired for preservation in the museum."

TWO COPIES OF GREEK ORIGINALS.—At the annual meeting of the subscribers to the British School at Rome, held November 17, 1908, "Mrs. Arundell Esdaile showed slides of two status, one recently found and one unpublished, copied from a Greek original of *c.* 460 B. C., and representing a boy engaged in the worship of Eleusis." From the peculiar ritual dress and attributes she connected them with the children which were every year chosen by lot from Eupatria families and initiated at public expense, preforming expiatory rites and serving as mediators between the gods and the rest of the *mystae*.

THE LION IN ANCIENT ART.—In an article in *Le Musée*, O. Théatis traces the history of the lion in art, showing it to be one of the most frequently represented of animals. The oldest example cited, is an ivory statuette found at Abydos. It represents a lion crouching ready to spring. The lion is common in Assyrian art, but there it is usually in a rage, or in the agonies of death; or has been slain. The finest Assyrian examples are the lion-hunts in the reliefs from Nineveh. In Greece it is common in Mycenæan art. On through historic times it is frequently met with in architecture and elsewhere.

BEHEADING CORPSES IN EGYPT.—A. Wiedeman shows from Egyptian literature that in early times the Egyptians dismembered the bodies of the dead. This custom, although discontinued later, was probably the origin of the legend of the dismemberment of Osiris. Beheading of the dead lasted longer. Four out of 137 mummies examined by Wiedeman showed signs of having been beheaded before mummification.

ROMAN CAMP AT WEISSENBURG, GERMANY.—Excavations carried on at the Roman camp of Weissenburg revealed a camp about 570 ft. by 587 ft. with the corners rounded off. The 4 gates were protected by towers, and the whole was surrounded by a ditch. At the intersection of the roads from the gates, was a large building with 4 main compartments. A covered portico 164 ft. by 36 ft. was connected with it by 3 doors. Many nails of various sizes were scattered about the rooms. The inner surface of the enclosing wall was covered by white stucco.

ROMAN COINS FOUND IN NORTHERN FRANCE.—M. Bourée recently found a large number of Roman coins near Acquigny. M. Coutil, who has acquired the larger part of the treasure, has cleaned them so that it has been possible to determine the age of most of them. They belong to the middle of the III century and the first part of the IV century, and include, among others, one of Constantine, one of Diocletian and over 800 of Gallienus and Salonine. Many of these small bronzes have been thinly silver-plated, while others of the same age found at Evreux and Andelys were well silver-plated.

THE SITE OF CAPERNAUM.—E. W. G. Masterman argues for the identification of Capernaum with Tell Hum because "the ruins show that an important city once stood here and the synagogue that has been discovered was evidently a very important one; second, the site agrees with the Biblical references; third, it also agrees with the statement of Josephus; fourth, all the statements of the early pilgrims down to Quarismus in the XVII century favor the identification with Tell Hum; and, fifth, Jewish references identify Kaphir Nakhum with Kaphir Tankhum, which latter word has subsequently been corrupted to Tell Hum."

PROPOSED ARCHÆOLOGICAL PARK ON THE PALATINE.—Plans for the enlargement, improvement and sanitation of Rome have been perfected and brought before the public by Edmondo Sanjust de Teulada, a Sardinian. If sanctioned by the State, this plan will take 25 years for completion. This plan allows, in the main, for the preservation of the archæological treasures of the city; in fact, it provides for the excavation of certain of the monuments, as the Baths of Diocletian, and the laying out of an archæological park covering the

Palatine, part of the Cælian and the Aventine and the valleys between. The incidental gains to archæology from the accidental finds in the progress of the execution of the plan will probably be great.

BRONZE MIRROR.—At a meeting of the Society of Antiquaries in London on December 3, 1908, Mr. Reginald Smith exhibited a huge bronze mirror of the Early British period. It is a remarkable example of the late Keltic art and is a "kidney-shaped plate, engraved on the back with eccentric scrolls and basket pattern, and furnished with a delicately moulded handle with loop at the end. It rivals the specimen found with personal ornaments in a woman's grave at Birdlip, Gloucs, the latter being decorated with red enamel. Both are of the size and shape of an ordinary palm-leaf fan." The mirror under discussion was found at Desborough, Northants. The objects associated with it point to from 50 B. C. to 50 A. D. as its date.

ORIGIN OF THE IONIC CAPITAL.—G. Kawerau believes that the primary origin of the Ionic capital was constructive rather than ornamental. The volutes on the face were suggested by "the rounding off of the ends of a saddle-block, or short timber laid on the top of a post beneath the roof-sill, and whether the two spirals sprang separately from the lower edge of the block or were joined together along the top, was merely a decorative matter," as were also the dropping of the volutes below the top of the post and the attempt to ease the transition from the rounded shape of the front of the column to the straight line of the front of the capital by inserting another member or shaping the lower part of the middle of the capital.

NEW MEXICO AND THE SCHOOL OF AMERICAN ARCHÆOLOGY.—At a recent meeting of the Archæological Society of Sante Fe, New Mexico, the proposition of the Archæological Institute of America to establish at Santa Fe a School of American Archæology was thoroughly discussed. The proposition asks for no financial support from New Mexico, but does ask the establishment of a state museum of archæology in the Old Palace. A legislative committee was appointed as well as a committee to draft a bill or resolution for introduction into the legislature to embody the proposition of the Institute. It is expected that Dr. Edgar L. Hewett will be in New Mexico during the legislative session in the interests of the bill.

WORK ON DELOS.—The French Archæological School of Athens has been carrying on excavations at Delos under the direction of M. Homolle. An alluvial deposit made by the small stream Inopos on the northern part of the island was partially uncovered. It contained fragments of pottery from historic times. In a shaft sunk by M. Homolle on his own account, was found a molar tooth of a fossil elephant. Professor Boule, of Paris, considers it a tooth of *Elephas*

antiquus. The island is so small, only 3 miles long and in some places 0.16 of a mile wide, that an animal the size of *Elephas antiquus* could not have lived there, unless it were connected with other land, probably with the Ægean continent. Hence the separation of the Ægean continent into islands must have been a relatively recent event. The observations of the volcanic phenomena of the region bears out this conclusion.

THE NESTORIAN STONE.—In 1907 Mr. Frits V. Holm went to Sian-fu, Shensi, China, for the purpose of examining the Nestorian stone, hoping either to purchase it or to obtain an exact monolith copy of it. This stone, dated 781 A. D., is covered with an inscription in Chinese giving an account of the early labors of the Nestorians in China. It was accidentally found in 1625 and placed upon a pedestal.

At the time of Mr. Holm's arrival at Sian-fu, the stone was neglected and little valued by the Chinese. His interest in it made them suspicious, however, so that he found it impossible to obtain the original, but was allowed to have a copy made. This was brought to New York, and, on June 16, 1908, was set up in the Metropolitan Museum, where it will probably remain, although not the property of the museum. The original has now been removed to the "Peilin" or Forest of Tablets, where its protection and preservation are assured.

EXCAVATIONS AT KAPERSBURG, GERMANY.—At Kapersburg, L. and H. Jacobi have carried on excavations. A small fort, nearly square, was found with walls of loose earth and stones held together by logs. This seems to have been a temporary structure, replaced later by a fort 348 ft. by 390 ft. and defended by a double wall with earth between. Later still the fort was enlarged to 400 ft. by 440 ft. Part of the interior, the Prætorium, was laid bare. Its walls are of heavy masonry, while those of the Exercise Hall are of wood. The store house was identified by an inscription in the northeastern corner of the fort. The walls of the "Villa," a 5-room house, were covered with stucco. That the ancient name began with "N" is known from the inscription mentioned above; possibly it was "Nidensium." Some 117 coins were found, dating chiefly from the middle of the III century. The pottery seems to be from the latter part of the II century A. D.

BRONZE PORTRAIT HEAD.—Sir Lawrence Tadema exhibited to the Society of Antiquaries a Roman bronze portrait head found in the spring of 1907 in the river Alde in Suffolk. He considers this one of the finest specimens of Roman portraits discovered since the Roman occupation. "The sculptor must have been one of the foremost among the many who worked in Rome during the Augustan era, and the head appears to be a portrait of one of the princes of the Augustan family, for it shows the characteristics of the portraits

accepted as representative members of that stock. The way the head was poised upon the neck suggested an equestrian statue, and the rough manner in which it was separated from the body, that it may have been destroyed and divided amongst the chieftains of some raid, each receiving a more or less equal quantity of metal as spoil. The Viking ship carrying the head may have been wrecked in the sands on the Suffolk coast and the head, through tidal action, have found its way up the river to the spot where it was found."

FIELD WORK OF THE INSTITUTE IN AMERICAN ARCHÆOLOGY.—Dr. Edgar L. Hewett reports that the field work of the Institute in American Archæology as laid out for 1908 was carried out. The work in Colorado "consisted in the excavation of the southern pueblo in the Cannonball group of ruins in the McElmo drainage." The ruin was completely excavated and all the material remains of the ancient inhabitants recovered. This is a good specimen of the ruins of the McElmo district, the first to be thoroughly and scientifically excavated.

The general work on the archæology of southwestern Colorado was continued. The photographic records of the Mesa Verde National Park and the archæological map were nearly completed. Similar work has been begun for the McElmo district.

In Utah, the Institute excavated the burial places and a portion of the main pueblo at Cave Spring in the Montezuma drainage on the southeastern slope of the Adapo Plateau. The results were very satisfactory.

MEETING OF THE ARCHÆOLOGICAL INSTITUTE OF AMERICA.—The Archæological Institute of America met in connection with the American Philological Association at Toronto, December 28 to 31, 1908. Five newly formed Canadian societies as well as a number of American societies became affiliated with the Institute. Among the most important of the proceedings of the meeting, was the approval of the offer made by the territorial government of New Mexico to give the Old Governor's Palace at Santa Fe for the permanent home of the School of American Archæology. It was also reported that the School at Jerusalem was on the way toward the acquisition of a home of its own. Among the papers read, was one by Professor Breasted, who has recently returned from the Nubian expedition of the University of Chicago, on the Temple of Soleb. He considers it a connecting link between the basilica-like construction of the Temple of Karnak and the ordinary structure of high pylon and lower walls that is seen in many Egyptian temples.

These two societies will meet jointly in Baltimore next December.

CHARACTER OF THE BLACK GLAZE FOUND ON GREEK VASES.—Oliver S. Tonks, of Princeton University, has been carrying on a series of experiments to determine the nature of

the black glaze on Greek vases. His conclusion is that the black glaze was "merely clay with soda and iron added—the former to help fuse it, and the latter to color it." Having determined this by chemical experiments, he went further, and tried to make a glaze, using clay from the potteries at Rocky Hill, New Jersey, which came from the Hudson valley. He found that it would fuse after the fashion of the Greek clay. Upon the addition of soda, it fused into a glaze, but had a brownish color, even after the addition of ferrous oxide, showing that there was too much ferric oxide present. Experiments with pipe-clay, which contains very little ferric oxide, brought better results. As pipe-clay occurs in the island of Naxos and as the Greeks are known to have used it on their white lecythi, it seemed a fair test to use it in the experiments. His work "proved eventually that a combination of 8 parts of nitrate of soda to one of clay, fritted together, and then mixed in the proportion of two parts of frit to one of ferrous oxide, produced a glaze identical with that on the Greek vases."

THE ROMAN FORT AT SAALBURG.—"In *Die Saalburg*, March, 1908, Lieutenant D. Ule gives an account of the present condition of the Roman fort at Saalburg. Within the wall a certain amount of ground on either side of the porta prætoria still remains to be excavated. The modern museum has been erected upon the foundations of the horreum. The quæstorium has been rebuilt and is used for a library and for other purposes. Between the quæstorium and the porta decumana lies a fountain over which a roof has been built. Holes for posts show that it had a roof in ancient times. Various objects found at neighboring sites have been brought together in the museum. In the northeast corner of the fort remains of 4 Roman ovens exist. They are placed side by side, but one of them must have been disused at the time the other 3 were built. Holes for posts show that they were probably covered with a rude roof. Along the inner side of the east wall at a depth of about 4 meters (13 ft.) below the present level two rows of sockets for posts were found, and corresponding holes for roof beams in the walls. The purpose for which this building was used has not yet been discovered. R. Oehler thinks that it may have served for barracks."

EARLY INTERCOURSE BETWEEN GREECE AND ITALY.—In a paper before the subscribers to the British School at Rome, Mr. T. E. Peet contended that not enough attention had been paid to the connections between Greece and Italy thousands of years before the classical period. Excavations in Italy and Sicily are now bringing to light evidences of these relations. In Neolithic times two civilizations seem to have flourished side by side in Greece. One was in Northern Greece and Thessaly, as found at Chæronea; the other occupied the Ægean Sea with Crete as center, and probably the Peloponnesus also. In Sicily and Southern Italy, incised pottery

parallel to that of Neolithic Crete has been found. Such pottery, although not found in northern and central Italy, occured in Sardinia and the district around Genoa. This would seem to indicate an ancient trade-route from the Ægean Sea to Sicily, and thence to Sardinia and the continent.

A connection of Italy with northern Greece appears from the painted pottery, clearly imported, found in the caves and hut-foundations, of Matera and Molfetta, near Brindisi. This resembles in some respects those found in Thessaly and northern Greece. Probably there was a trade-route across the Adriatic from Thessaly or Epirus to southeastern Italy and also Sicily, as resemblances between painted vases of the early metal age indicate. In the rock-hewn cemeteries of the second Siculan period around Syracuse and Agrigentum, numbers of imported Mycenæan vases and bronzes were found. Trade with Mycenæan centers appears to have extended to the head of the Adriatic. Trade relations were cut off with the breaking up of the Mycenæan power, and were later reopened.

RESEMBLANCES AND DIFFERENCES BETWEEN THE ITALIOTS AND THE ETRUSCANS

At the second annual congress of the Italian Society for the Progress of Science, held in Florence in the autumn of 1908, Professor Luigi A. Milani, director of the Archæological Museum at Florence, read a paper on the *Resemblances and Differences between the Italiots and the Etruscans.* The report of this paper as given in *The Nation* for November 19, 1908, is so concise that it seems well to quote it at length:

"His address, in the opinion of such specialists as Pigorini, Pernier and Pasqui (recently appointed director of excavations at Rome), is a notable addition to our knowledge of the earliest Italian races. The Etruscan material of the early iron period exhibits analogies with that of the same period in the Emilia and the Veneto, especially in the methods of disposing of the dead in urns of the Villanovian type, and in objects placed in the tombs; but the differences and new elements are sufficiently marked to indicate a transformation of the Italiot civlization under the direct influence of another people of wholly different civilization, distinct customs, artistic expression, and religion. In developing his argument, Professor Milani made use of the rich resources of his museum and the most recent discoveries in Crete. He laid stress especially upon the ovoid and spherical receptacles for the remains of the dead; the *canopi* (cinerary urns bearing portraits of the deceased), which he regards as allied to Oriental death-masks; upon other urns found only in Etruria and Latium which

are unlike the Villanovian type and imitate thatched huts, houses, shrines, and temples, and resemble forms recently excavated in Crete; upon bronze covers in the shape of pileated and crested helmets and their earthen imitations; and upon covers shaped like round or oval shields—all forms which originally were peculiar to the earliest Etruscan sepulchres. The discovery of pre-Hellenic seals in Asia Minor, bearing the image of Sabekh, the warrior god of the Hethei, and the seal found at Ventulonia, no longer permit doubt as to the connection between the helmet with a crest or apex or priest's mitre and the cult of the Kureti or Cretan Dattili, or as to the introduction into Etruria in the most remote times of this mysterious pre-Hellenic cult, which runs back to the bronze age and belongs specifically to Ægean civilization. The conical shields typical of the Cretan Kureti are analogous in form and use to those discovered at Vetulonia and at Gassofortino, and to the twelve sacred shields trusted to the care of the Salii of the Palatine and Quirinal. Characteristic changes in methods of burial also point to the conclusion that, at a certain point in the development of Italiot civilization, a people who brought the Dattilic religion of the Ægean and that civilization which existed in Greece and Crete in the pre-Hellenic period, must have established themselves in Etruria. Evidence that the Etruscans originated in Asia Minor is furnished strikingly by the bark found in the tomb of the Duce at Vetulonia and by three *stelae* in the museum at Florence, the Aulo Elusukes of Vetulonia, the *stelae* of Larthi Aninies found at Fiesole, and that of the warrior Larthi Atharnies from Pomarance.

"The papers by Dr. Luigi Pernier of Florence on the *Latest Excavations at Festo* and the *Archaic-Greek City of Prinia in Crete*, by Cavalier Angiolo Pasqui of Florence on the government excavations which he has recently conducted at Monteleone, near Spoleto, and Dr. Giorgio Karo's report of the *Explorations of the German Archaeological Institute in Pylos*, incidently gave unexpected confirmation to Professor Milani's argument on the Etruscans. Prof. Antonio Taramelli of Cagliari gave a vivacious account of 6 years spent in investigating the primitive civilization of Sardinia. Signor Taramelli's papers will be published in the Orientalist's review, *Memnon*, and Signor Pasqui's in the *Notizie degli Scavi*, issued by the Accademia dei Lincei. Prof. Luigi Pigorini, whose semi-centennial of academic service was celebrated at Parma immediately after the close of this congress, spoke on the Civilization of Etruria during the Bronze Period of the Lake-dwellers of the Terramare, which awaits new excavations for an adequate solution of its problems. The section voted to ask the government to grant the necessary staff of assistants and the funds to carry out the plan which Professor Milani has already formulated. It voted also in favor of the extensive exploration of prehistoric fortifications of the type studied by Professor Pasqui near Spoleto."